JUL 14 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JULY 14, 1898. CHICAGO, ILL NUMBER 2

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On Page 24.

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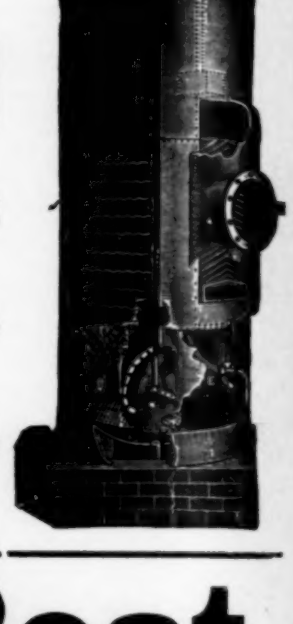

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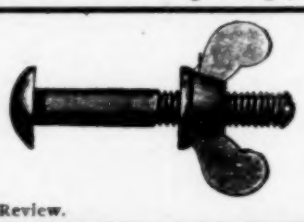

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JULY 14, 1898. CHICAGO, ILL. NUMBER 28

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

In the absence of immediate market developments of significance, the iron trade is making calculations on the revival which is everywhere scheduled to follow the end of the war. Every day seems to be bringing home to Spain the hopelessness of her position; but experience shows that it is not safe to make business calculations on the early capitulation of an enemy driven to bay and desperate. The bond subscriptions have made little impression on the money supply, and in spite of the expected demand for funds to move the crops, there is abundance of capital for the coming industrial and commercial expansion, concerning which practically the only uncertainty is the day of its beginning. There is nothing but optimism in the views of those in the iron trade whose judgments are based on largest information; but reports of week-to-week developments are conflicting. Pittsburg has seen plainly the slackening of new buying, since the middle of the year. Chicago has fared better, and in the past week has booked business in nearly all finished lines, equal to the tonnage turned out. The agricultural implement trade and the railroads of the West keep up their phenomenal activity, and some tonnage in rails has been refused at Chicago. The East makes a more favorable report than in June. The amount of buying in that section since the opening of the month has been unusual for the dull season. The prices available have evidently encouraged buyers to fill up for the second half. It is probable that, in spite of the reports of quietness in pig iron, more business has been done in foundry grades in the past two weeks than in any like period in years, with the possible exception of 1895. At Chicago a 4,000-ton lot for malleable purposes is under negotiation. Renewals of contracts have been made in satisfactory volume in the East. In the Central West foundry grades are a trifle easier in price, but the ordinary mid-summer slowing down of foundry operations is having no effect upon shipments. Foreign business is somewhat more active, several inquiries for foundry iron from Continental points having come up in the past fortnight. Bessemer iron is lifeless. Further curtailment of production is promised for July. It appears that a considerable amount of iron is on furnace books for shipment in the third quarter, and thus the deadlock may be prolonged for some weeks. The over-abundance of production, in spite of the moderate decline of the past two months, delays the improvement in prices for which producers have been hoping. The situation in respect to finished material is much the same. The market seems incapable of an advance, be the volume of business never so large. Structural mills have done a surprising amount of business, when the cutting off of large projects is considered. One Pittsburg mill made its largest June record last month.

PITTSBURG.

OFFICE OF *The Iron Trad Review and Industrial World.*
808 TRADESMEN'S BUILDING, July 13.

The general aspect of the market is that of last week in nearly every line. Heavy materials, while showing little in the way of new business, are still keeping the mills busy from the orders of some months back. In finished lines there is little or no movement. The mills made a heavy output in June, but just now new business is not equal to the shipments of rolled products.

PIG IRON.—The "small amount" of outside Bessemer iron, like the oil in the widow's cruse, seems to maintain its original proportions. At all events furnace transactions are not reported and the quotation remains at $9.75 to $9.85 valley. A Pittsburg price of $10.25 has been reported in connection with one recent transaction. The recent talk among furnacemen of raising the pool price to $10.50 has not been taken seriously. Foundry irons are in no demand. The quotation for No. 2 is $10. Gray forge is quiet at $9.10 to $9.15 Pittsburg and $8.80 to $8.85 valley mill. Quotations are as follows:

Bessemer, valley	$ 9.75 to $ 9.85
Bessemer, Pittsburg	10.40 to 10.50
No. 1 Foundry	10.40 to 10.50
No. 2 Foundry	10.00 to 10.25
No. 3 Foundry	9.50 to 9.75
Gray Forge, valley furnace	8.70 to 8.75
Gray Forge, Pittsburg	9.10 to 9.15

BILLETS AND RODS.—The requirements of the leading rod and wire interest, mostly for Western shipment are still largely uncovered, though some Chicago buying is reported. The market is quiet and may be quoted $14.75 maker's mill Pittsburg and $14.50 valley and Wheeling district. Sheet and tin plate bars are also inactive, but the mills are well filled on contracts. Prices continue at $16.50 and $16.75 maker's mill. Rods are quoted $19.75 and $20.

PLATES.—The mills are busy and the demand continues fair. The Western railroads have come to the front as the last purchasers in this line and a good tonnage was booked in the past week. Prices remain unchanged and are as follows: Tank, 1.10c; shell, 1.15c; flange, 1.20c; fire box, 2c and upwards.

BARS.—The market is quiet and last week's prices still hold. We quote 90c to 92½c for steel bars; bar iron, 90c valley, mill; refined iron, special brands, 1.15c to 1.20c Pittsburg.

SPELTER.—Spelter has advanced a little from last week's prices and is now quoted at $4.85 to $4 90.

SPIEGEL.—There is no immediate demand and the price still holds at $23.50 to $24.

FERRO-MANGANESE.—The quotation is maintained at $50 for 80 per cent domestic delivered.

STRUCTURAL MATERIAL.—The market in structural material remains unchanged. The mills are filled with a good tonnage, and while nothing large is in sight the number of small orders continues good. One local firm shipped a greater tonnage in June than ever before in that month. Prices are as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c; zees, 1.15c, and angles, 1.05c. Universal plates in connection with other shapes are selling at 1c; alone, at 1.10c.

SHEETS.—Notwithstanding that this is the dull season, sheet mills, with a single exception, report their business to be better than at this time for several years past. The present condition, however, is due to business booked some time back, new orders not being numerous. Prices remain unchanged, 1.95c for No. 28 being the market for the most part, although some business is reported at 2c in the last week. Galvanized sheets are stiffer than two weeks ago, the present quotation being 80 and 7½ to 80 and 10 per cent off list with 15 cents freight.

RAILS AND TRACK MATERIAL.—The railroads continue to be good buyers. Steel spikes have dropped a little from the prices given last week. They are now quoted from 1.40c to 1.45c. The prices of the other material remains unchanged and is as follows: Rails, $18, Pittsburg; iron track bolts, 1.65c to 1.70c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

IRON AND STEEL SKELP.—The market prices of last week still hold in iron and steel skelp, as follows: Grooved iron skelp, 1.05c to 1.07½c; sheared iron skelp, 1.12½c to 1.15c; grooved steel skelp, 97½c to 1c; sheared steel skelp, 1.05c to 1.07½c.

PIPES AND TUBES.—The meeting of the pipe and tube men in New York this week will be watched with interest, as it is reported an attempt will be made to secure a general advance in prices. One of the largest concerns in this branch of the trade resumed work Monday after a shut down for repairs. Reports indicate that the mills are well filled so much so in fact, that prompt deliveries in some cases cannot be had. Prices are unchanged. Additional discounts of six tens for less than carload lots and six tens and 2½ for carload lots being quoted. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is quoted at 60 and 5 per cent and screw and socket joint at 65 and 5 per cent.

OLD MATERIAL.—The demand continues very dull. No sales of any size are reported. Prices are as follows: Old iron rails, $13.50 to $13.75, valley; cast borings, $6, net, valley; wrought turnings, $7, net, valley; railroad cast scrap, $9.50; wrought scrap, $11.50, valley; iron axles, $16, net; steel axles, $12.50, gross; car wheels, $10.50, gross; charcoal scrap, $10, gross; billet and bloom ends, run of mill, $11; busheling scrap, $9.50 net; machine scrap, $9 gross.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, July 13.

While the demand for pig iron is no larger than it was a week ago, and is light, the inquiry for steel of all kinds is excellent, and quite large sales are made every week. Within the past week the local steel company has sold more than its current output of every form of steel it makes, and the outside mills have also done a large business. The market does not advance, although there are indications that some mills are trying to secure better prices.

PIG IRON.—Business has been light, and it does not appear that there will be any immediate increase in the tonnage of sales. Buyers appear to have their wants satisfied, or nearly so, for the present. Foundries in this district are nearly all running full, and the furnaces are having some difficulty in keeping up shipments as fast as the foundries want them. The outlook for the fall trade is excellent, and the furnaces expect that it will open earlier than usual and be larger. There is no change in prices, and while the open quotations on Southern irons remain the same, some furnaces are anxious enough for business to make considerable concessions. The local furnaces, on the contrary, are very firm and are selling at quoted prices all the new business they can handle. At present this is not much:

Lake Sup. Charcoal....	$11 50 @$13 00	Southern Coke No. 3...	$ 9 75 @$10 00
Local Coke Fdy. No. 1	11 50 @ 12 00	Southern No. 1 Soft.....	10 35 @ 10 60
Local Coke Fdy. No. 2	11 00 @ 11 50	Southern No. 2 Soft.....	10 10 @ 10 30
Local Coke Fdy. No. 3	10 75 @ 11 00	Southern Silveries.....	11 25 @ 11 50
Local Scotch Fdy. No.1	11 50 @ 12 00	Jackson Co. Silveries..	12 50 @ 14 50
Local Scotch Fdy. No.2	11 00 @ 11 50	Ohio Strong Softeners	12 00 @ 12 25
Local Scotch Fdy. No.3	10 75 @ 11 00	Alabama Car Wheel...	15 00 @ 16 00
Southern Coke No. 1...	10 35 @ 10 60	Malleable Bessemer ...	11 50 @ 12 00
Southern Coke No. 2...	10 10 @ 10 35	Coke Bessemer.....	11 50 @ 12 00

BARS.—The week's business has been very satisfactory, and included some good contracts, although the bulk of the business was in small orders. In some cases attempts are made to get higher prices, but most of the business placed goes at the quotations. Common iron is quoted at 1c to 1.05c; guaranteed at 1.10c to 1.15c; soft steel bars from strictly billet stock at 1.05c to 1.10c.

RAILS AND TRACK SUPPLIES.—The local mills have made sales of about 15,000 tons of rails in each of the last two weeks. The tonnage was composed of a number of comparatively small orders, in addition to one or two good sized contracts. The demand for both light and heavy sections has been good, and seems likely to remain so for some time. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—Sales of billets and rods to the total tonnage of about 15,000 tons have been made in each of the past two weeks, and the demand gives every indication of keeping up at this rate for some time. Besides this tonnage, closed by the local mills, considerable sales have been made by outside sellers. Prices are unchanged at $16.25 for billets and $22.25 for rods.

CAR ORDERS.—Orders for cars included two of 500 each, and one of 1,000. Further business is in sight, and is expected to be placed immediately. The car material sales have been large and promise to keep up in the next few weeks.

STRUCTURAL MATERIAL.—The Chicago & Northwestern Road has given out contracts for track elevation which will take about 4,600 tons of material, to the Lassig Bridge & Iron Co. The steel will be furnished by the Carnegie Steel Co. The contract for the new addition to the Western Electric Co. plant has been let, and will take about 1,500 tons of steel. This also will be rolled in Pittsburg. The Carter estate will erect a building immediately, taking about 1,200 tons. General business in small lots is excellent, and the tonnage of the week was very heavy. The market is very firm. Quotations are as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.25c; tees, 1.35c to 1.40c. Small lots from stock are quoted at ¼ to ½ cent higher.

PLATES.—The local mills made sales of about their week's output last week, and report a good demand. Outside mills also made good sales, and the total tonnage placed in the week was very large. The chances for a good summer season improve every week, and the mills are expecting the usual summer dullness will be unheard of this year. Quotations are unchanged, but are very firm. Prices are made as follows: Tank steel, 1.15c to 1.25c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

SHEETS.—There is a good demand for both black and galvanized sheets, and sales last week were fully as large as those of the week previous. Most of the business placed was in comparatively small lots, but a number of large contracts were placed. No. 27 black sheets are quoted at 1.95c to 2.05c, and galvanized sheets at 80 and 10 and 2½ per cent discount.

MERCHANT STEEL.—Large sales were made last week, including several seasons' contracts. Mills are expecting the good business will continue, as the demand shows no signs of decreasing. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—The market has been quiet, with only a few sales, and these not large. There is a fair demand for some classes of scrap, but others are exceedingly dull. Prices are unchanged. Dealer's selling prices are as follows:

Old iron rails, gross,	$12 25@$12 50	Axles, net.....	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net.....	4 25@ 4 50
Old steel rails, short....	8 75@ 9 00	Wrought turnings, net	6 00@ 6 50
Old wheels, gross.....	11 00@ 11 50	Axle turnings, net.....	7 00@ 7 25
Railroad forge, net.....	11 50@ 12 00	Mixed steel, gross,.....	7 25@ 7 50
Dealer's forge, net.....	10 00@ 10 50	Stove plates, net.....	5 75@ 6 00
No. 1 mill, net.....	7 50@ 8 00	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net.....	8 50@ 9 00	Old iron splice b., net.	12 75@ 13 00
Malleable cast, net.....	8 00@ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., July 13.

Ore shipments from Lake Superior, as indicated by reports from the canal office at Sault Ste. Marie, were 1,629,103 gross tons in June, making a total to July 1 of 3,323,597 tons, against 2,291,875 gross tons to July 1 last year. It is within bounds to estimate the total movement of ore from all ports, up to July 1, at 4,250,000 tons, which is much beyond all records. To July 1 last year the official total was 3,028,584 gross tons; to July 1, 1896, 3,680,465 tons. There is still some new business in ore, chiefly on the non-Bessemer side of the market. The supply of some of these ores that are most sought is not equal to the demand. Mesabi non-Bessemers, which are plentiful enough, are selling at $1.70 to $1.80, a 62 per cent ore containing .075 phosphorus bringing about $1.75

In the case of one or two Mesabi ores, the shipments this year have not come up to the analyses of last year, owing to unevenness of the deposit. This characteristic has been confined heretofore, for the most part, to the surface ore, but the variations this year in the ores referred to, which are from underground properties, indicate much greater unevenness than is found in any of the old range formations.

PIG IRON.—The valley furnace situation is unchanged. Another Mahoning valley stack is to go out in the coming week. In the Shenango valley only two merchant furnaces are now active. No further meeting of Bessemer pig iron producers is expected be held until September. Meanwhile, though $10 at furnace is not established, furnacemen are satisfied that the movement has been productive of good, the opinion being expressed that the market would doubtless be 50 cents lower than the present level, had there been no concerted effort. Deliveries are being made on third quarter contracts, but not as rapidly in some cases as furnaces could wish. A re-sale of 5,000 tons at $9.75 valley furnace is reported. Foundry iron is quiet, and sellers who have held at $9.50 for No. 2 are shading a trifle. The valleys evidently did their part in ending the career of the Non-Bessemer Pig Iron Manufacturers' Association, only three firms out of 10 being represented at the last district meeting. Forge iron remains at $9.70 to $9.75 valley furnace, with little movement, though considerable purchases are yet to be made for the second half. Lake Superior charcoal still has a steady malleable and ammunition trade. We quote f. o. b. Cleveland:

Bessemer,	$10 65	Valley Scotch No. 1	$10 40@10 65
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 25
No. 2 Strong Foundry	10 10@10 40	Gray Forge	9 20
No. 3 Foundry	9 65	Lake Superior Charcoal	11 55

FINISHED MATERIAL.—A quieter market is noted locally in the past few days. Several valley mills have started up in part, after a 10-days' shut-down, promised deliveries requiring them to resume. In other cases repairs will take a few days longer. Current business is in small lots. Prices show no variation. Some tonnage in bars is still pending, the mills not being inclined thus far to entertain prices offered. We quote .98½c to 1c Cleveland on steel, with iron quoted .90c to 92½c valley mill. Sheets are firm, and with higher quotations by Pittsburg mills, the Cleveland basis is 2.05c for No. 27 and 2.10c to 2.15c for No. 28. Structural business is light, but Pittsburg mills have managed to keep busy thus far, specifications on contracts coming in fairly well. Plates are generally quoted 1.10c Pittsburg, though mills able to give near deliveries are a trifle lower. Local wire and nail business is of fair volume. Jobbers who loaded up just before the consolidation was made are rather wary of the market and the stocks now carried are in manufacturers' hands. We quote $1.15 for smooth wire and $1.30 for wire nails, car load lots.

OLD MATERIAL.—There is some movement all the time, but prices are low and dealers find little or no profit. We quote old iron rails at $13.50 valley; old steel rails, $10.25; No. 1 wrought scrap, $11.25, delivered; old car wheels, $10.75, Cleveland; cast borings, $5.75; machine cast scrap, $8.25.

CINCINNATI.

July 13.

The business of the week has been light comparatively, but not disappointing, as a larger business was not looked for. Deliveries are going forward freely from the furnaces to meet the demands of consumers. There is a likelihood of an early termination of the war, and manufacturers are considering plans to be inaugurated when peace is restored. Notwithstanding the large amount of funds Government bond subscribers have withdrawn from circulation, money continues easy and rates accommodating. The growing crops give promise of a large yield. The railroads are quite busy, and every avenue of traffic seems active with the current volume of business, which, in a general way, is satisfactory to the country. Prices on pig iron continue low, but on brands that command the business, prices are firm. We quote for cash f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.50; No. 2, $9.25; No. 3, $8.85; No. 4 and gray forge, $8.50; mottled $8.25 to $8.50; No. 1 soft, $9.50; No. 2, $9.15; Tennessee charcoal, No. 1, $12.50 to $13; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Jackson county silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

PHILADELPHIA.

July 12.

There are plentiful indications of a steady demand ahead, and the general belief that with hostilities at an end—as may be the fact in the very near future—there will be a speedy outflow of money into new undertakings, gives abundant confidence. Yet immediate transactions are not controlled by these influences, and there is a heavy market in some lines. Buyers who contract for material for the rest of the year pay quoted prices as a rule; but on prompt deliveries there are considerable concessions, and some sellers eager to make sure of tonnage, have discounted the better prices that may come with the fall. The fact that deliveries are being well taken is indicative of a large and well distributed consumption that is noteworthy in a month ordinarily marked by numerous suspensions of operations. Negotiations for 1,000 and 2,000 ton lots of pig iron for delivery at Baltic ports show how the foreign trade is drifting toward this country. We quote on No. 1X foundry iron, $11.25 to $11.50, Philadelphia; No. 2X foundry, $10.50 to $10.75; No. 2, plain, $10 to $10.25; ordinary mill irons, $9.75 to $10; Bessemer, $12 to $12.25. The mills are having a satisfactory run of work. Plate mills, in particular, are having all they can do. Structural material and sheets have brought in an excellent aggregate, though without any very large contracts. Bar mills could do more and prices are yielding. The Delaware shipyard work recently let has furnished a good tonnage for Pittsburg mills, and there is every confidence that the seaboard yards will be very full of work for the next few years. On plates it is believed the present mill capacity will be well taxed, and prices are being more firmly held. We quote plates at 1.20c to 1.25c; angles, 1.20c to 1.25c; beams and channels, up to 15 inches, 1.30c; refined iron bars, 1.05c to 1.10c; steel bars, 1.10c.

Spanish-American Iron Co.'s Losses.

President Charles F. Rand, of the Spanish-American Iron Co., 26 Broadway, New York, issues an address to the stockholders of the company, detailing the effect of the war in Cuba upon the operations and property of the company. He says that on April 21, when war was declared, the property of the company in the Santiago district was in operation with a full force, and with 175,000 tons of ore sold in advance for delivery in the United States and Europe, there had been every prospect of a prosperous year. At the request of Gen. Linares, commanding the Spanish forces, operations were discontinued, and after interviews with State Department officials at Washington all American employes were withdrawn from Cuba. No damage was done to the company's property until June 22, when Gen. Shafter's army landed at Daiquiri. The Spanish troops at that point retired after burning the machine shop and contents, the engine house and two locomotives and starting fires in the warehouse and on the wharves. These, however, were extinguished. The docks of the company have been constantly used by the army and navy of the United States, and its pipe line has supplied the vessels with water. The loss of the mining company is put at $100,000, leaving out its tug Colon, worth $20,000, which the Spanish took, but which it is hoped will be recovered. Steps will be taken to repair the property, and it is hoped that ore shipments can be resumed in 60 days.

THE Van Dorn Iron Works, of Cleveland, have had a number of important contracts on hand in the past few months and are still well occupied with structural and jail work. Among recent work on which shipments have been made are the following: Two steel cribs for the city of Cleveland, completed; a second shipment on the contract for the Long Island City jail; an additional contract for the Maryland penitentiary—window guards, etc., and a contract for the Baltimore reformatory; a shipment on the Butler, Pa., jail contract (the whole contract being taken and portions of the work sublet); shipments on prison or jail contracts for Hampton, Va.; Dade City, Fla., and Schenectady, N. Y. The company has also taken the entire contract for the construction of a warehouse and factory for the Roderick Lean Mfg. Co., of Mansfield, O. The large facilities of the Van Dorn Iron Works have made it possible for the company to take a great amount of work calling for prompt shipment. Of late its business has been largest in the Middle and Eastern States, but the exceptional prosperity of the West in the past 18 months is likely to be followed by considerable construction work in that section.

THE IRON TRADE REVIEW

AND

INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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JULY 14. 1898.

SPECULATION IN IRON STOCKS.

When stocks are once listed on an exchange, more or less public discussion of their fluctuations and of their intrinsic merit may be expected. But there has been something too much of newspaper prominence in the case of the American Steel & Wire Co. When the more comprehensive aggregation of the wire interests of the country was under negotiation it was said in these columns that while there were economies in manufacturing and in distribution to be attained through such an amalgamation, and in that particular the movement was entirely in line with the progressive evolution going on in the iron trade, the speculative features of the program laid out were not to be commended. Overvaluations, excessive stock issues and a vigorous stock campaign, which have been features of every large consolidation the country has known, were pointed out as possible dangers. While we are told that the officers of the new company deprecate stock manipulation, there is evidently not sufficient unanimity on this point to prevent the publication of statements about the company's business and prospects that are to be taken as a strong bid for the attention of promiscuous investors. While a number of iron and steel stocks are now listed, there are but one or two concerning which it can be said that the stock column reports reflect the views of an interest evidently alive to the profits of the speculative market. Since the days of the Southern town lot and blast furnace combination, which are now happily over, the iron trade has been measurably free from such influence. True, the pig iron warrant system is promulgated under the plea that as men will gamble in some commodity, therefore let that commodity be iron; but we do not find in the iron trade at large the disposition to sanction or to foster speculative elements.

The movement of events in the trade is away from speculative interference with the forces that are operating to make this country the greatest and the cheapest purveyor of iron and steel for the world. The Pittsburg market, that but a little while ago was subject more than any other in the country to the manipulations of speculators, is now governed more and more by the legitimate operation of supply and demand. A half dozen brokerage firms in iron and steel have been eliminated in as many months, because the broker's occupation is going, if it has not already gone. Indeed, buyers and sellers, whose opportunity lies in frequent fluctuations, are finding the conditions less hospitable for their business. The fierceness of the struggle for commanding position has simplified the situation amazingly. The fewest handlings in the transit between raw material sources and the shipping department of the mill is the imperative demand on the manufacturing side of the iron and steel business to-day. The shortest line between maker and consumer, cutting out all commission by-ways, is equally demanded, on the commercial side.

In these respects, at least, the iron trade is working back to the simplicity of early business methods. We cite them simply as illustrations of the tendency. If there is little or no room for the iron and steel broker, there is certainly less room for the stock broker. It is going in the face of forces that cannot be resisted with safety to encourage the maintenance of speculative features either in connection with iron products or iron stocks. Iron and steel manufacture is a very naked proposition today; and whatever profit is made must come from the closest study of the problems of the mill and the market, rather than the fluctuations of the stock exchange. The statement in a Wall Street journal, for example, that late buying in an iron and steel stock recently listed there "has been altogether by insiders, who express strong views as to the future price," would indicate a diversion of effort from usual managerial channels. It is certainly unwise—and demonstration will be ample of the fact—to attempt to subject the iron trade to any greater extent to the domination of a speculative craze that has hurt every industry it has touched. The history of railroad securities and of a few conspicuous industrial stocks should be sufficiently instructive on this point.

TWO IMPORTANT LAWS.

Two recent enactments of Congress would have had far more attention, but for the country's absorption in war news. We refer to the Phillips Industrial Commission act and the new National bankruptcy law. The Phillips bill had a long struggle, the previous Congress crowding it out, though it was known that a strong sentiment existed in its favor. The original measure provided for 21 commissioners — five representatives each from labor, agriculture and business—to be appointed by the President, and each group of five to select two additional members. The bill as passed creates a commission of 19 members: five Senators, to be appointed by the Vice-President; five members of the House, appointed by the Speaker, and 9 persons representing capital and labor, to be appointed by the President. It is announced that

Hon. T. W. Phillips, author of the bill, is to be made one of the President's appointees, and such action will meet with general approval. The scope of the commission's inquiry is broad, embracing the latest developments in industry; the tendency to aggregations of capital; the effects of machinery upon labor; the relations of employer and employe; the future of agriculture in the United States, and the influences that have changed its status in recent years; the labor union movement; improvements in the condition of the wage-earner; arbitration in wage-disputes, and many other phases of industrial, social and economic problems. The drift of economic changes will no doubt be an important element in the inquiry.

It may be said that the commission can have no practical outcome, and will only gather the conflicting testimony that confronts the investigator in all these fields. We are not so sure of this. It may be that the time is ripe for the gathering of facts from which some deductions of permanent value can be made. The scheme has a good precedents in the English Royal Commission of Labor, appointed in 1891, which made valuable reports covering a wide range of facts, and in the permanent councils of labor established in France and Belgium.

The new bankruptcy law is so elaborate and complicated a piece of legislation that no review of it can be attempted here. The remarkable fact about it is that after so many years of vain attempt to enact such a measure, in response to the continued and urgent petitions of the business world, a bill should be passed that would draw so little criticism as this one has received The fact of most importance to our commercial and industrial interests is that a uniform procedure in insolvency cases is at last guaranteed, instead of the inequality and injustice of the State statutes, of which many creditors have had experience in recent years to their sorrow. The weaknesses of the last National bankruptcy measure have been avoided, and the experience of the past 25 years in the administration of the estates of insolvents has taught much that is incorporated in the new law. Actual operation may disclose defects; but it may be promised in advance that the flagrant inequities in insolvency practice, for which a few States are notorious, will not shield dishonesty in the way that too long has been suffered.

Death of Percy Preston.

Percy Preston, one of the best known and best regarded of iron and steel commission men in Pittsburg, died suddenly on Monday, July 11, at his residence 400 Penn ave., Pittsburg. He was in his 35th year. Mr. Preston went to Pittsburg in 1884, having previously been in the New York office of H. E. Collins. He was a member of the firm of Preston & Humphries, and later of Preston & Co., which became Darr, Preston & Moore about six months ago. Mr. Preston was unmarried and lived with his brother Veryl Preston, who removed from Sharon, Pa., to Pittsburg the past year.

A New Monthly Record at Duquesne.

No. 3 furnace at the Duquesne works of the Carnegie Steel Co. had an output in the month of June of 17,448 tons, which establishes a new record for one month. This amounts to a daily average of 582 tons.

THE Whiting Foundry Equipment Co., Harvey, Ill., have their shops filled with work. They are having a particularly good demand for hoists, cranes, etc.

LAKE SUPERIOR IRON MINES.

Each volume of the "Mines and Mineral Statistics of Michigan" is better than its predecessor. The third volume, prepared by Geo A. Newett, Commissioner of Mineral Statistics, is at hand, and it merits the same hearty commendation given to the reports of 1896 and 1897. Probably no one in the State is as familiar as Mr. Newett with the mines on its three iron ranges, and his thorough-going investigations are embodied in documents well worth preserving. The changes in mining methods have been not less noteworthy than those in markets, in the past four or five years, and the transition to closer economies and to a larger scale of operations is reflected in the reports on the various properties. Particular interest attaches to the review of operations at certain Gogebic properties, the ownership and management of which were changed last year. There is quite as comprehensive a review of copper mining operations, and space is devoted also to the minor minerals of Michigan. The production of charcoal pig iron at Michigan furnaces in 1897 was 126,113 tons, or 20,756 tons less than in the preceding year. The output of the Pioneer Furnace at Gladstone was 36,700 tons. At this plant the by-product yield was 102,914 gallons of wood alcohol and 932,478 pounds of acetate of lime.

J. R. Thompson is now superintendent of the Dunn Mining Co.'s mines, succeeding F. E. Woodbury.

The stockholders of the Hartford Iron Mining Co. met at Milwaukee last week and decided to sell the property, which is at Negaunee, Mich., for sufficient to cover the indebtedness of $40,000. The mine has been idle since 1893.

The Lincoln mine at Crystal Falls will be unwatered and will be operated by Corrigan, McKinney & Co. There is some talk, also, of resumption at the Great Western mine, which adjoins the Lincoln. Both mines yield non-Bessemer ore.

A Decision in the United States Mitis Co. Case.

In the United States Circuit Court, Monday, July 11, a decission adverse to the Carnegie Steel Co., Ltd., was made by Judge Acheson in the action brought by the United States Mitis Co., which alleged infringement of the Wittenstrom process of making castings from wrought iron. The plaintiff alleged that the Carnegie Steel Co. infringed on the Wittenstrom process for manufacturing castings from wrought iron and steel by adding aluminum. The defendant admitted that the process it used in the manufacture of armor plate and steel ingots was somewhat similar in material results, but that it was no infringement because the application of the process was entirely different from that of the Wittenstrom. Judge Acheson says: "The evidence is clear that Wittenstrom's invention was of a primary character. The defendant has pursued two practices in the casting of steel ingots—the 'armor plate' process and the 'ingot' process—which processes are fully shown by the evidence. . . . The defendant's experts claim the Wittenstrom method is a smelting process, and, therefore, that the treatment with aluminum is not within the patent, but I do not discover any good reason for imposing such limitations on the patentee. The problem of manufacturing sound castings from wrought iron or steel is precisely the same, whether the molten metal is produced in the one way or the other. The language of the specifications is broad enough to cover molten wrought iron or steel, however the molten condition is brought about. The defendant insists that ingots, such as it makes, are not castings within the claim of the patent, but the arguments on this point are not satisfactory. No one can read the testimony of defendant's witnesses without perceiving that by the addition of aluminum to the molten steel in the act of casting ingots the benefits of the patent are obtained."

It is expected that the case will be taken to the U. S. Circuit Court of Appeals.

THE M. Leman Iron Works, 1315 Broadway, Cleveland, have been well employed of late. The product is gratings, railings, wrought iron fences, lawn seats, tree guards and hitching posts.

THE Broadway Foundry, Cleveland, located on S. Dille st., near Broadway, has been kept busy in the last few months on stove repair work, which is its specialty. The addition built last spring has proved timely.

DRILLING AND TAPPING MACHINES.

The illustrations represent in Fig. 1 a sensitive drill and in Fig. 2 a vertical tapping machine, manufactured by Thomas Pettifer & Co., of Cleveland, who make a specialty of light machinery. Fig. 1 is known as a No. 4 drill. For light drilling, for work on brass goods, hardware specialties, sheet metal operations or for multiple work of the lighter kinds, it is particularly adapted. It is simple in construction and effective in operation. It is especially constructed for the countershaft attached to the column. No overhead fixtures

FIG. 1.

are required, but one pulley on the main shaft being needed to make it ready for use. It is exactly the same as the No. 3 drill of the same manufacturers, except for being mounted upon a pedestal. The distance from the center of the spindle to the face of the column is 5⅜ inches; the diameter of the table 9 inches. The height from the top of the pedestal to the top of the spindle is 33 inches. A one-inch driving belt is used.

The No. 8 tapping machine shown in Fig. 2 is designed for drilling or tapping holes up to 5-16 inch diameter. The machine is driven by a friction clutch between two pulleys, which are driven respectively by straight and crossed belts, and is operated by foot lever, leaving both hands free to hold the work. The driving pulley runs on a sleeve which relieves the spindle of wear and the pull of the belt. The distance from the center of the spindle to the face of the column is 5⅜ inches. The diameter of the table 9 inches., and it has a vertical adjustment of 16 inches. The weight is 185 pounds.

THE H. E. Teachout Boiler Works, Cleveland, Jas. D. Farasey proprietor, are now building the eighth of the portable asphalt paving plants which they have furnished the F. D. Cummer & Son Co. These plants include boiler work, sand conveyor, drier and mixer, and the tanks in which the asphalt is prepared before being mixed with the sand. The Teach-

FIG. 2.

out works have been well employed on boiler and tank work, having facilities for all kinds of heavy plate and riveted work.

THE latest product of the advertising ingenuity of the Gobeille Pattern Co., Cleveland, is a vest-pocket booklet 1½x2 inches, bound in miniature silk flags—the American flag for the front and the Cuban flag for the back cover. There are four pages of reading matter, which counsel foundrymen to do with patterns as they do with facing—buy from those with whom their manufacture is a specialty. Division of labor, special tools and thorough system, added to large output, are the features of the Gobeille Pattern Co.'s operations.

ELECTRICAL POWER IN MANUFACTURING.

At a recent meeting of the Western Society of Engineers, at Chicago, a discussion was held on electrical pneumatic and mechanical power transmission in manufacturing establishments. Prof. D. C. Jackson, whose papers on electrical transmission before the Chicago society as well as the American Society of Mechanical Engineers, will be remembered, contributed the following:

The question of power transmission in manufacturing establishments may be stated thus: What can be installed to do the work in manufacturing establishments in transmitting power from the prime mover to the machines, with (1) the least cost for the plant, and with (2) assurance of the least operating costs and the best satisfaction in operation?

We all must admit that for general purposes electric transmission is likely to cost materially more than shafts and belts, or shafts and ropes. While I have had no experience with compressed air, I am inclined to the belief that pneumatic plant installed for general transmission purposes would be much more costly than electric plant. On the other hand, for many special purposes the first cost of electricity is no greater than the first cost of other transmitting agents which will do the work. There are many places in which shafts and belts, or shafts and ropes, cannot serve satisfactorily. In the latter places electricity has often displaced other means of transmission; and we now have numerous manufacturing establishments in this country which turn out a heavy or bulky product, in each of which considerably over 1,000 h. p. of electric motors are in use driving general machinery. There are some plants which individually use over 2,000 h. p. in electric motors. In these cases the electrical machines have almost invariably replaced older methods of transmission with success and advantage, as is shown by the fact that electrical transmission is being increased in magnitude in almost every one of the plants referred to.

Such favoring of electrical machinery is particularly evident in iron and steel plants, where electrical transmission has shown its advantages particularly on account of the enormous weight, and in some cases the great bulk of the product that is gotten out which narrowly limits the possible positions of the operating machines. In such classes of work electrical transmission gives the greatest advantages, because an electric motor can be placed anywhere that it is desirable to place it alongside of its machine which it drives, and the transmitting wire may be twisted around corners or poked through holes without loss of efficiency and without added expense. In steel works we have had much transmitting of power from boiler plants directly to engines located all over extended works, but that is not as a rule as economical as electricity, as is shown by the rapid extension of electric power plants in existing steel works. As a rule, the already established general manufacturing establishment, that is the manufacturing establishment for ordinary product (product which is neither remarkably bulky nor remarkably heavy or which does not require a special degree of cleanliness), does not find sufficient advantage at the present moment to make it clear that the old transmitting agents should be thrown out and new placed in the works. The extra capitalization required for such a change undoubtedly makes a pretty heavy load in many cases; yet there are quite a number of manufacturing establishments of the general type that would find it greatly to their advantage to make the change.

In regard to new establishments, I summed the matter up in my earlier papers, and will quote briefly from them: "For plants using not less than 100 h. p. the electricial transmission is so much more satisfactory and economical that it is a misfortune for a new manufacturing plant, except under very exceptional conditions to be constructed with any type of transmission except the electric." This refers to the transmission of power for general purposes about the establishments. There are many special classes of work that can be carried on advantageously by compressed air, but the compressor can be driven from the electrical system.

As a summary of the whole matter, I will quote again from the earlier papers:

"1. In constructing new manufacturing plants, the extra first cost of a complete system of electrical transmission for the works is negligible (except under exceptional cimcumstances), compared with the annual savings effected by its means when its advantages are properly utilized.

"2. In certain industries the advantages of electrical transmission outweigh the first cost of making a change from mechanical to electrical transmission in established plants, while in many plants where this condition would not commonly exist the arrangement of buildings or the growth of the plant is frequently of a character with reference to the prime power plant which places electrical transmission upon an advantageous footing, either as an auxiliary to the main transmission or as a rival to the existing mechanical transmission."

You will notice the statement in this quotation, "when the advantages of electrical transmission are properly utilized." Therein lies a very important matter. Different industries require entirely different arrangements of plant, as has been shown by experience, and the arrangement must be given the most careful attention to attain the best results. An electrical power plant which is put into a manufacturing establishment should be installed for the purpose of operating all classes of apparatus which are intended to be operated by electricity. This, of course, is not intended to include call bells and other playthings, but it should include all the important matters. In other words, unless the plant is exceedingly large, the same installation of machinery should operate motors for driving machinery, operate electric lamps for lighting, and operate other appliances which may be useful. This is very readily brought about by the use of either continuous currents, or alternating currents. I am inclined to believe that the alternating current motor has so clearly shown its advantages as to place it on a very important footing in this work. I was inclined to doubt that it had proven its peculiar advantages 18 months ago, but it has had an opportunity to prove them since then, and it certainly should be placed upon an even footing, possibly a little better than an even footing for certain classes of work, with the continuous current motor.

It can be taken for a fully established fact, that either continuous or alternating current electrical machinery is as reliable as any class of machinery that is now built. The experience in severe service which was met by electrical machinery on electric railways, and which was satisfactorily met, has brought the construction of electrical machinery for all purposes to a degree of perfection that makes it as reliable (as said above) as any type of machinery that is built.

Electric Power in Rolling Mills.

Mr. Eugene B. Clark, of the Illinois Steel Co., read a paper from which we take the following:

The conditions existing in a large rolling mill are particularly advantageous to the use of electric power for operating many of the auxiliary machines which are scattered throughout such a plant. The large area, compared with the average manufacturing plant, which is covered by a steel mill, necessitates either a large number of small complete steam units or else a large amount of piping. The economy of either method is so low as to be prohibitive in many cases, consequently we must either bring the outlying machines into a small radius at the sacrifice of convenience and economy of operation, or we must adopt some cheap method of power transmission. Both pneumatic and hydraulic transmission has each its own particular field in which it possesses superior advantages, but when the field of each has been covered there still remain a large number of places to which power can be conveyed by electric means far more cheaply and far more conveniently than by any other method. Of course, the question of economy is the prime consideration, but the word "economy" to the manager of a rolling mill has a somewhat broader meaning than it does to the average station manager. The question of convenience of operating a mill is oftimes so important that an apparently wasteful method is frequently preferable to one which is more economical from the steam producer's standpoint. A highly efficient motor may be, and generally is, much inferior to one whose mechanical excellence and high insulation reduces its liability to break down to a minimum. Of course, what we want is a combination of all these qualities, but it is not always possible to obtain it. The uses to which electric power is put in a steel plant are numerous and diversified. Among them may be mentioned:

1. Lighting, both arc and incandescent. Much of the arc

lighting is preferable of the series kind, by reason of the considerable territory to be covered, and as yet the open arc lamp has not been displaced to any considerable extent for series work, though the enclosed lamp is making inroads upon its field. For inside lighting, however, meaning the lighting of the interior of the mills, constant potential enclosed lamps possess advantages, which are even more marked than in many of the stores and halls where they have superseded the open arc. The trimming of an arc lamp in a mill during a week day nearly always seriously interferes with the operation of a part of the work being done there, so the installation of long burning enclosed lamps saves more money than is represented by the decreased cost of carbons, the decreased labor of trimming, the decreased repairs and attendance on series arc machines, and the decreased fuel consumption attendant upon running small units instead of large ones, as usual in such comparatively small lighting plants. Incandescent lighting may be of two kinds also with advantage. Such as is necessarily far distant from the source of generation should be alternating, from considerations of economy of transmission, while such as is close at hand may be direct, operated directly from the constant potential mains.

2. Series motor operation: This covers the use of motors on traveling cranes, electric hoists and conveyors, charging and drawing machines, table rolls, transfer cars, etc. All such motors are operated intermittently, and therefore make demands upon the steam plant only at times the and in the proportions that work is demanded of the motor. This means, of course, that no losses occur in the transmission lines except when power is being used.

3. Shunt motors operated intermittently. This covers the use of electric power to drive lathes, shears, pumps, fans, crushers, drills, punches, etc. Such motors operate rather more steadily than series motors, but still their demands upon the generator are decidedly uneven.

4. Shunt motors operated continually. There are always some such motors distributed through a large plant to operate grinding machines, crushers, pumps, fans and similar devices. Some of these operate all of the time, some only during the week days, some at night, and some in the day and so on.

5. Incidental uses. By these may be covered the use of electric current in lifting magnets, signals, testing devices, etc. The power used in this way is considerable.

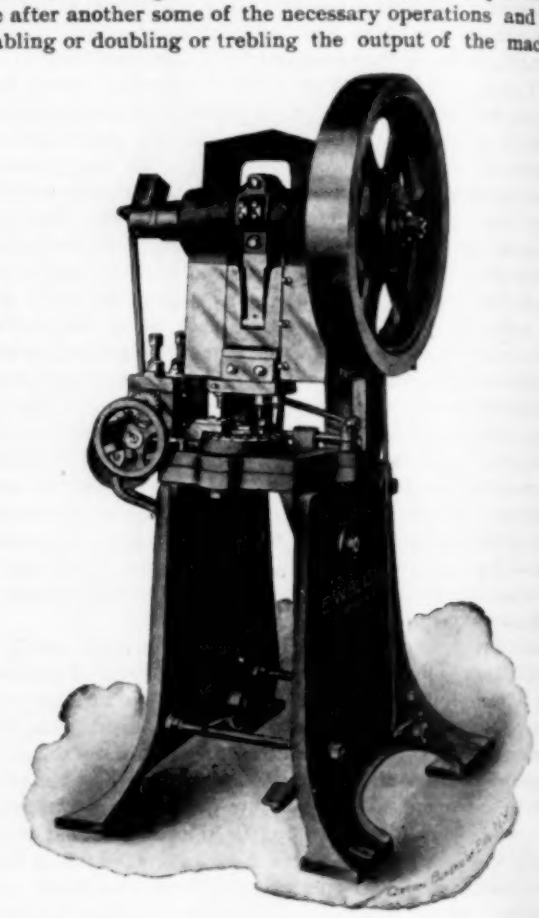
Upon a careful consideration of the relative value of each of the above classes of loads depends the intelligent design and location of the generating plant. For rolling mill work at present, direct-current apparatus seems much better suited than alternating, on account of the difficulty of properly controlling alternating current motors under such conditions as exist on traveling cranes and similar machines operated each by a number of motors. However, it is the controlling device which gives the trouble with direct-current apparatus now, and not the motor, if it is a good one; and if an entirely new plant were being built, it would be a question to be very carefully investigated whether the advantages of transmission by an alternating system would warrant its installation as against a direct-current system. The most suitable voltage is between 220 and 250, the former being preferable for smaller plants, and the latter for larger ones. The units should be chosen of as large a size as is compatible with a sufficient allowance for reserve power, without too high an investiment for machinery. The load curve on the generating plant should be carefully plotted from readings on such motors as are already installed (if the question is one of increase), and from careful consideration of the probable character of the increase of load. A study of the probable load curve gives opportunity for intelligent selection of units.

A load curve plotted from the conditions existing at the South Works of the Illinois Steel Co. shows that beginning at 6 A. M. the load is about 400 amperes, from which it increases rapidly to about 700 at 7 o'clock. Then just before noon it runs up about 100 to 200 amperes, but drops off to about 400 again between noon and 1 P. M. It runs up a little before 6 P. M., more or less, according to how dark it is, and then drops off again, somewhat, after 6. This cycle is repeated again during the night, the load being a little heavier, however, on account of the lights.

P. W. O'Brien, of the Chicago office of the Illinois Steel Co., is spending a few weeks in Canada.

AUTOMATIC ROLL AND DIAL FEED PRESS.

The machine shown in the accompaniying illustration is an automatic press built by the E W. Bliss Co., 6 Adams st. Brookklyn, N. Y. It is used for manufacturing paper fasteners and other small sheet metal staples. It takes the metal from the coil and advances it by means of a single roll feed to the punching dies. These deilver the blank into the dial plate which carries it to the bending and shaping tools. The hand wheel shown is for starting the strip, after which the feed is automatic. This press may be supplied with one, two or three punches, according to the nature of the work, performing one after another some of the necessary operations and thus enabling or doubling or trebling the output of the machine.



It may be run at considerable speed, making 125 strokes per minute, or producing from 125 to 375 operations per minute, or from 75,000 to 225,000 operations per day of 10 hours. This type of press is adapted to many operations.

Some of the principal dimensions of the machine illustrated are as follows: Size of opening in bed, 10 inches; opening in bed, round, 10 inches; distance from bed to bottom of slide when up, 7¼ inches; standard stroke of slide, 1¼ inches; adjustment of slide, 1 inch; weight of fly wheel, 150 lbs.; weight of press, 1,700 lbs. The stroke of the slide, opening in the bed and other dimensions can be changed slightly to suit special requirements.

Personal.

Theodore C. Search, president; Chas. A. Schieren, treasurer, and E. P. Wilson, secretary, of the National Association of Manufacturers, have been honored by President Ignacio Andrade, of Venezuela, with the badge of the Bust of the Liberator Bolivar. This bestowal is in recognition of the efforts of the association to foster trade relations between the United States and Venezuela.

Chas. H. Morgan, president of the Morgan Construction Co., Worcester, Mass., sails for Europe July 14.

Geo. A. Baird has been made assistant general manager of the Sharon Iron Co., Sharon, Pa.

The Chicago Stamping Co. confessed judgment last week on notes aggregating $244,134 made in 1896 and 1897 in favor of Frank Sturges, father of Lee Sturges, president of the company. The following day, on application of the Simonds Rolling Machine Co., of Fitchburg, Mass., the Chicago Title & Trust Co. was appointed receiver of the Stamping company, fraud being alleged in the bill.

Review of the Technical Press.

BY DR. RICHARD MOLDENKE.

Passage of Carbon into Iron During Cementation.—A paper under the above title was read by Mr. Geo. J. Pitt, before the South Staffordshire Institute of Iron and Steel Works Managers. While with us the cementation process for making steel is of interest only historically so far as the commercial aspects are concerned, yet the excellence of the product turned out at the time when blister steel was made in great quantities, will account for the attention given to anything written about it even now. Mr. Pitt states that there is much controversy as to the mode in which carbon passes into the iron; and that Sir I. L. Bell has proved that the carbon need not be in a gaseous condition to accomplish the work of carburization. To see if this holds true at very high temperatures, Mr. Pitt reported Sir I. Lowthian Bell's experiments with this in view. Two pieces of iron, one cast and the other wrought, were placed together, surrounded by two inches of charcoal and the whole placed in a case of cast iron. This block was heated to bright redness daily in a heating furnace, cooling only at night. The trial extended over 12 days. On opening and attempting to separate the pieces, they were found cemented together, their surfaces being broken when torn apart. Investigation showed that the wrought iron piece had absorbed carbon from the cast iron one. Changes of the wrought iron piece under tools as well as of its specific gravity were also noted. Mr. Pitt supposes that a greater freedom in molecular action is developed in the carbon as the temperature becomes very high, this having been observed in the case of silicon and boron. The fact is also brought out that welding may begin at lower temperatures than is usually considered necessary, though what effect time may have on this is not stated. Mr. Pitt gives his theory of the passage of the carbon, which in brief is as follows: Scouting the bare possibility of the carbon being liquid, for this does not occur even in the electric furnace, the carbon must be either gaseous or solid. If gaseous, how came it thus? And if solid what is its action under the conditions? Mr. Pitt's idea is that the solid carbon developes an increased molecular movement very rapidly as the temperature rises to bright redness, and that this movement in connection with a similar though smaller one on the part of the iron allows an interchange, the carbon passing freely and the cohesion of the iron holding it within bounds. The temperature most advantageous to the proper conduct of the cementation process is a bright red heat; at a lower temperature the action is too slow. Several other theories to account for the difference of the carbon are given, for instance that the outer layer of the iron absorbs enough carbon to become, so to say, saturated with it, and then loses its avidity for more until it has given off some to the next layer, and so on to the center of the piece. This would hardly look right, however, for on stopping the process at any time the theory should be capable of demonstration, and while we know that iron can absorb a considerable quantity of carbon, cement steel does not show the uniformity in carbon contents the theory just given would seem to necessitate. Again, the theory that the carbon unites with oxygen making CO_2, and this in contact with more carbon makes $2CO$, which in turn splits up, giving the carbon to the iron, would seem weak from the very idea that the whole process is conducted with a view of keeping out the oxygen. Thus Mr. Pitt's first explanation seems to be the correct one so far as an extended experience with the behavior of carbon and iron under heat would make it appear to the reviewer. Now carbon will also diffuse into porcelain, for this was shown by Marsden, who brought finely divided amorphous carbon into contact with it at high temperatures. Mr. Pitt concludes with the description of a series of rather negative experiments on the diffusion of other metals, such as iron with zinc, copper, and tin.

THE Niles Tool Works, Hamilton, O., is reported to have purchased a large interest in the Pond Machine Tool Co., Plainfield, N. J. The companies will not be consolidated, but it is said that there will be a co-operation by which the shipping and other like expenses will be reduced. It is also reported that the new tool works in Berlin, Germany, to be known as the Deutsche Niles Werkzeug Maschinen Fabrik, will be owned by these two companies.

INDUSTRIAL NOTES.

The Turner Engineering Co., Marion, O., has received an order for two 100-h. p. Turner water tube boilers for a college building in Philadelphia.

The directors of the General Electric Co., at their recent meeting ih New York voted to recommend a reduction in the value of the common and preferred stock of the company, so that each holder of 100 shares of present stock will receive 60 shares of the news stock. The plan adopted contemplates the payment from the surplus earnings of the company of the accrued dividends on the preferred stock. On the basis of the new capital, $1,275,000 will be required annually to pay seven per cent on the preferred stock and six per cent on the common. A special meeting has been called for August 10 to act on the question of the reduction. The outstanding stock is: Common, $30,460,000; preferred, $4,252,000. A stockholders' meeting will be held at Schenectady, Aug. 10.

The P. L. Kimberly rolling mill, at Sharon, Pa., is running full on an order for cotton ties. A new finishing mill is being built.

The Sheffield Coal, Iron & Steel Co., of Sheffield, Ala., has ordered from the Weimer Machine Works Co., of Lebanon, Pa., a blowing engine having a 50-inch steam cylinder, 96-inch air cylinder and a stroke of 60 inches. The engine will weigh 350,000 pounds. It is of the vertical type, having puppet steam valves, with Weimer's cut-off governor attached.

The sale of the furnace of Boyce, Wheeler & Co., at West Middlesex, Pa., has been adjourned from the day originally fixed to Thursday, July 21, at 2 P. M.

Among recent car orders are those of the Wabash, 500 to the St. Charles Car Co., and 500 to the Missouri Car & Foundry Co.; Northern Pacific, 500 box cars with the Illinois Car & Equipment Co.; Chicago, Milwaukee & St. Paul (reported), 1,000 box cars, to be built at the West Milwaukee shops; Philadelphia & Reading, 200 cars placed with the Lebanon Car Mfg. Co., Lebanon, Pa.; 200 with the Jackson & Wooden Co., Berwick, Pa.; 100 with the Middletown Car Works, Middletown, Pa.; 500 with the Union Car Co., Depew, N. Y.; Houston, East & West Texas, 50 freight cars with the Pullman Palace Car Co.

The Wilbraham-Baker Blower Co., Philadelphia, Pa., will install a large electric crane in its erecting shop. It is being built by the Shaw Electric Crane Co., Muskegon, Mich.

Work will be pushed on improvements at the Cramp Shipbuilding & Engine Co.'s plant, Philadelphia. Contracts are being let for numerous new tools, for a system of overhead cranes for the rapid handling of material, and for other machinery. The system of hoisting and conveying machinery will be put in by the Brown Hoisting & Conveying Machine Co., of Cleveland.

After a long run, Claire Furnace, at Sharpsville, Pa., is being shoveled out for extensive repairs.

Grace Furnace, of the Brier Hill Iron & Coal Co., Youngstown, has started again after repairs.

While the Eagle Iron & Steel Co.'s mills at Ironton, O., are shut down, an additional engine and a new muck train will be put in.

Engines are being taken from the Hubbard to the Youngstown plant of the Mahoning Valley Iron Co.

Dreses, Mueller & Co., of Cincinnati, have remodeled their shop by putting in a new brick front and offices and drawing room on the second floor. They have added a basement space for the smith shop, a stock and wash room of 1,500 square feet and another floor of 6,000 square feet, which they have filled with new machinery. Their business is good, but the foreign orders still amount to 80 per cent.

The American Steel & Wire Co. has declared a quarterly dividend of 1¼ per cent, payable Aug. 1.

The Londonderry (Nova Scotia) Iron Co., Ltd., C. A. Meissner, general manager, has contracted for about 1,000 tons of the 12-inch and 24-inch cast iron water pipe, which the National Foundry & Pipe Co., of Scottdale, Pa., obtained from the city of St. John, N. B. The balance of the order will be filled from Scottdale, Pa.

The city council of Portsmouth, O., has decided to have a popular vote July 25, on the proposition to issue $40,000 bonds to retain the Burgess Iron & Steel Co. plant. The company has agreed to surrender its leasehold of the property occupied by the jail works on the payment of $40,000 by the city.

A WELL LIGHTED SHOP.

An important consideration in the designing and building of modern manufacturing plants is the lighting of the interior of the building. Such works are located, generally speaking, in large cities, or at least in districts where the population is somewhat dense, so that there is great liability to loss by the owners on account of the employes watching passers-by or having their attention attracted by occurrences in the adjoining streets. At the same time the importance of thoroughly lighting the interior is such as to take precedence over all other questions. The problem presented is how to secure a well lighted interior and at the same time have the sides of the building so constructed that the employes are unable to have their attention drawn by what is taking place just outside.

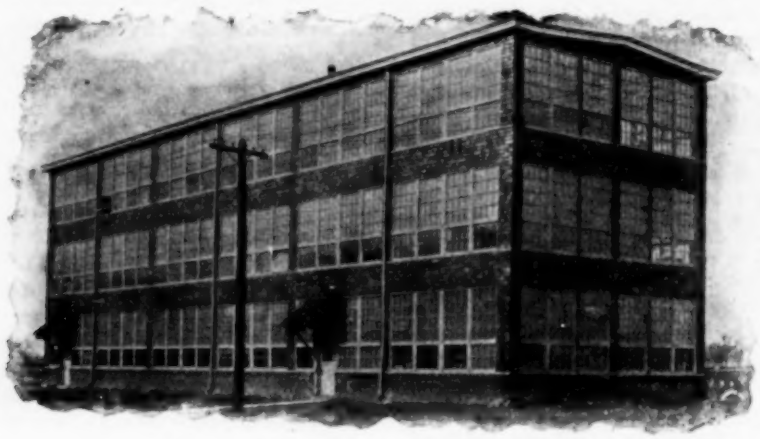


FIG. 1.

The illustrations show a machine shop designed and built by the Berlin Iron Bridge Co., of East Berlin, Conn., for the Veeder Mfg. Co., of Hartford, Conn. The Veeder Mfg. Co. manufactures the Veeder cyclometer. The mechanism is very fine, and the different processes of manufacture require the best light. The Veeder Mfg. Co. some time ago decided to build an entirely new plant, and the views given are of their new machine shop without and within. The exterior of the building is of a somewhat novel construction. The supporting framework is entirely of steel, the greater portion of the construction being steel and glass. It is three stories in height, 30 feet in width, 110 feet in length, the three floors giving nearly 10,000 square feet of floor surface, every inch of which, owing to the well diffused light in the interior of the building, can be occupied with manufacturing purposes.

Fig. 2 shows the interior. The photograph was taken in the second floor, showing the supporting girders of the third floor above and the truss work forming the supporting girders for the sides of the building. The interior is heated by hot air forced into the interior of the building from an adjoining boiler room by means of ducts located and made a part of the supporting columns of the building. This peculiar feature of the building was designed by C. H. Veeder, the president of the company, and adopted by the Berlin Iron Bridge Co. The sides of the building are almost entirely of glass, but arranged in sections so that they can be easily opened and closed, thus securing plenty of fresh air. It is a popular idea that if the sides of a building are made of glass, the interior in warm weather will be insufferably hot, as in a green house. The facts are exactly opposite. Owing to the excellent ventilation secured by the swinging of every other panel of the glass on a center pivot, perfect ventilation may be secured, and thus instead of being exceedingly hot in warm weather it is extraordinarily cool and pure, clean air from the outside is furnished for the workmen.

The power employed is electrical. The current for power and lighting is obtained from the local electric light and power company at the pressure of 220 volts and in two phases. The 110-volt lamps are distributed by the ordinary three-wire system, the numbers on each phase being about equal. Power is derived from General Electric two-phased induction motors. A 5-h. p. specially wound motor is used to run the elevator, the motor being directly belted to the hoisting mechaism and reversed by a special switch. To avoid excessive currents in the armature winding when starting, the end connections in the armature winding are of high resistance metal. Some trouble was found at first on account of the excessive momentum of the armature, but a flange pulley was placed on the armature shaft and the belt allowed to run sufficiently loose so that the belt can slip on the armature pulley when the hoisting mechanism is stopped quickly. This arrangement has been in use several months and gives no trouble.

The tool room and machine shop are driven by a 5-h. p. motor with standard winding and the finishing room is driven by a 3-h. p. motor. The motors have proved very satis-

FIG. 2.

factory, running steadily and requiring but little care.

The *Engineering News* raises this interesting question in connection with the glass construction of the shop described above, "What will it cost to heat the building in cold weather? It is generally considered by heating and ventilating engineers that the emission of heat from glass surfaces is much greater than that from ordinary walls and roofs of buildings. If this is true, the heating of this building would be somewhat expensive. At any rate the building offers a good chance to get some valuable data on the subject. We would suggest that an approximate idea of the cost of heating independent of the power needed to circulate the warm air, could be obtained by measuring the drip from the air heating coils by means of a water meter. A reading of the meter taken every night and morning, together with the records of registering thermometers, one recording the temperature inside and the other that outside of the building, woutd furnish data that should be of great value to heating and ventilating engineers and to mill architects."

THE PASSING OF A CHIMNEY.

When the tracks of the New York, New Haven & Hartford Railroad were elevated recently at Jamaica Plain, Mass., it became necessary to remove a number of the adjacent buildings of the B. F. Sturtevant Co., and to change the location of

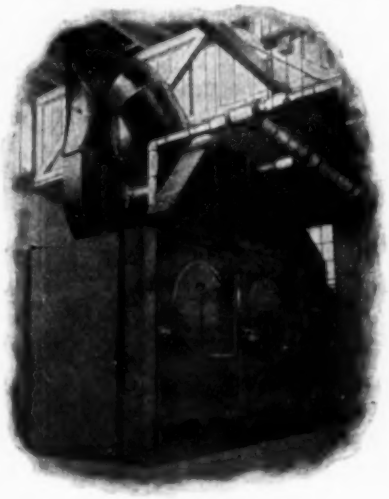


FIG. 1.

the existing boiler plant. The chimney, which had previously served as a means of producing draft, was thus rendered absolutely useless because of its distance from the new location of the boilers. It became a question whether another chimney should be erected or a fan employed to produce the draft. The B. F. Sturtevant Co., who are large manufacturers of fans and are installing large numbers for the purpose of mechanical draft naturally turned to the latter. A specially designed fan was placed on top of the boilers, connection was made to the uptake, and a short stack was provided extending just through the roof. The general arrangement of the apparatus is shown in Fig. 1. The fan is equipped with a direct connected upright engine, the speed of which is so regulated by an automatic device that the draft is materially increased when the steam pressure falls slightly. The result is practically constant steam pressure. The arrangement has required no attention, fulfills the requirements, makes possible the burning of cheaper fuel, and has a marked influence in the prevention of smoke.

The deterioration of the unused chimney and the desire to use its bricks in the erection of a new building, led to its removal, and there is now the unusual spectacle of a large manufacturing establishment without a chimney, or at least anything that fills the ordinary definition of such a structure. The view in Fig. 2 shows the works as they now appear, the present steel plate stack from the fan being visible on the right about half way down the length of the buildings.

Since the fan is usually built of steel plate its construction may be made to fulfil perfectly the requirements. It may be used either for forcing the air to the ashpits or exhausting it from the uptake; it may be placed above the boilers or in any location where the space is not valuable; its capacity may be varied at will; great intensity of draft may be maintained without reference to the conditions of the weather, which often affects the working of a chimney. The draft may be maintained moreover, while the waste heat in the gases is utilized by the economizers. Another fact is that it can be installed for much less first cost than a chimney. These considerations are leading to an increasing use of the system, and indications point to its continued displacement of the tall stack.

CAST iron water pipe at $16.60 per net ton delivered in Boston seems to be a record low price. The Warren Foundry & Machine Co., of Phillipsburg, N. J., lately made a contract with the Metropolitan Water Board to deliver 937 tons of 12 to 36-inch pipe at that price; the pipe to be delivered at Brighton, Forest Hills, Glenwood and Clinton, on the line of the new Metropolitan Water Supply. Nearly one-half the pipe ranged in diameter from 30 to 36 inches. We believe the transportation cost on the contract will be about $3 per ton, making the actual price received for the pipe at the foundry little more than $13.—[Engineering News.

THE Cleveland Tool & Supply Co., No. 5 Long st., Cleveland, established about 18 months ago, succeeding the Bosworth Tool & Supply Co., reports that it has been very busy

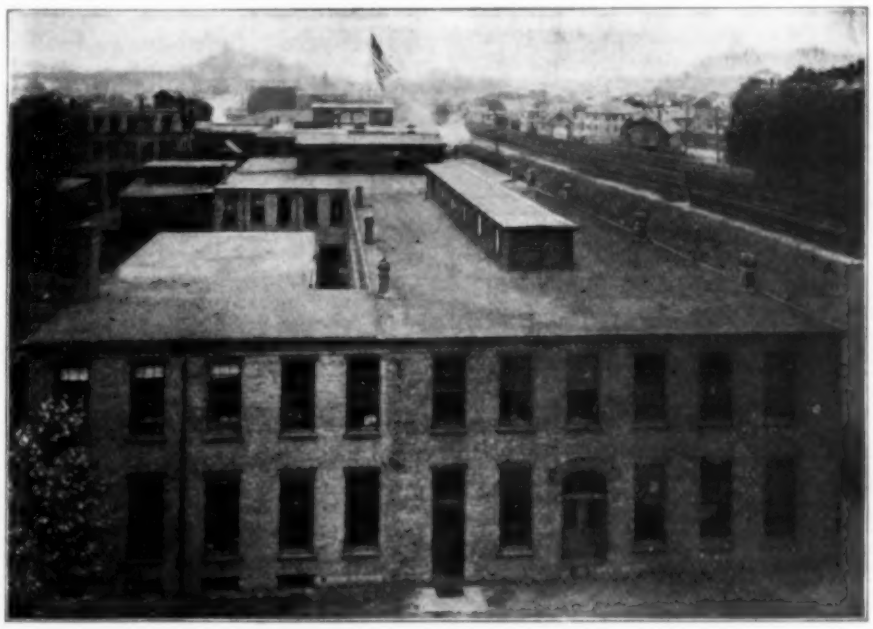


FIG. 2.

all the year, though just now there is a little slacking down in some lines. The company has agencies for the Norton Emery Wheel Co., B. F. Sturtevant Co., Shultz Belting Co., the Skinner Chuck Co., the Builders' Iron Foundry, Hanson Van Winkle Co., manufacturers of platers' and polishers' goods, and J. Barton Smith Co., manufacturers of files and rasps. Large stocks of files are carried. In other lines, also, it is the policy of the company to carry large supplies, so that orders may be filled without waiting, this being the chief value of a supply house. The territory especially covered includes Ohio, Indiana, Michigan and Western New York and Pennsylvania.

WILLIAM HOLLAND, 60 S. Canal st., Chicago, maker of brass and bronze castings and various specialties, reports having secured some very good orders for his torches and brazers from Germany, and that his local trade is quite a little better than it was a month ago, with every indication of a good business in the immediate future.

S. FREEMAN & SONS CO., of Racine, Wis., recently installed a large steam-actuated Ingersoll-Sargent compressor.

MACHINE SHOP AND FOUNDRY.

Technical Graduates in the Shop.

The question of the efficiency, or inefficiency, of our technical schools is an ever fruitful one for discussion, and there are as many opinions regarding it as there are people to express them. Its latest phase has taken the form of answers to the question, "Why are our fresh graduates of engineering schools such incapable draftsmen?" which have appeared in at least two technical journals. Similar questions might be asked and often are asked regarding other lines of work. Managers wonder why these young men are so incapable in the shop, office, or engine room, and it seems to be the impression that, after four years' training, they ought to be able to turn their hands to anything in an efficient manner; if they cannot, then schools and school systems are blamed, and numberless suggestions are made for their improvement.

These views on the part of managers' are quite likely to spring from claims made by young graduates, and even by their instructors as well. It is too often claimed that a technical course equips a man in a thorough manner for practical work, making him capable of earning a good-sized salary in any department of his profession.

Such a claim is absurd on the face of it and will do as much to injure the standing of a college as any other one thing. Mechanical engineering, for example, includes the construction of every kind of a machine from windmills to 13 inch guns and full-jeweled watches. It embraces not only machine construction, but the erection of power plants, the superintendence of chemical works and other work of a general character; and in these different branches it includes all sorts of positions from president down to the man who chases castings. It is plainly evident, therefore, that it would be only by rare good luck that a student should secure a position for which he was fully equipped. What a college can do and does is to ground its men in general principles so that in after years they will be able to work understandingly and advance rapidly—though beginning, it may be, at the bottom like every one else. It does not make "efficient draftsmen," machinists, inspectors, designers, superintendents or efficient anything else, except efficient students, ready to learn practical lessons and to profit by them so well that they will soon become efficient in whatever position they may occupy. A college course is for general training, simply.

Take the subject of drawing. This is one of a large number of general subjects that enters more or less into all branches of mechanical engineering and therefore is one of the subjects that should be included in the general training. In one course of instruction that we have examined the total time devoted to drawing is equivalent to about three months of work at eight hours a day. This time, however, includes all the recitations and lectures, as well as the time spent in the drawing room. It also includes all the instruction in a theoretical course in descriptive geometry and in the course in machine design, by far the larger part of which would be other than drawing board work. It is safe to say that the whole time spent in actual drawing would not exceed two months of similar work in the drawing room.

. It is probable that two months' time is all that it is thought best to devote to drawing. Only a small part of the graduates are to become draftsmen and the time must be given to other subjects. Two months' practice, however, will not make a good draftsman out of an untrained hand. He may either make neat drawings, or may draw rapidly, but he will not be able to do both at once, as he must do if he is to be an efficient workman. Moreover, how can a draftsman be called efficient before he has mastered the details of his line of work? One student might begin by detailing car trucks, another steam engines and another machine tools. They all have had the same course of study, general in its nature, and they all must secure their own special knowledge by practical experience.

We believe the colleges are doing good work and that their graduates are making a satisfactory showing. They are, in the main, securing good positions, and the records show that the average student steadily rises from the time of graduation. If, instead of being asked why students are inefficient when fresh from school, we were asked the more pertinent question, Why are they so efficient after they have had a few years' experience, we should say: Because they have been well grounded in general principles at school and because, at graduation, they have become efficient students, ready to profit by lessons that can be learned only in practical life.—[Machinery.

A Gating Device—Gleanings from Foundrymen's Meetings.

E. H. Putnam, one of the vice-presidents of the American Foundrymen's Association, and foundry editor of the Chattanooga *Tradesmen*, writes of the ways in which foundrymen's gatherings benefit those who attend, and illustrates what he says by an incident of the Cincinnati convention. We reproduce his observations from the last issue of the *Tradesmen*:

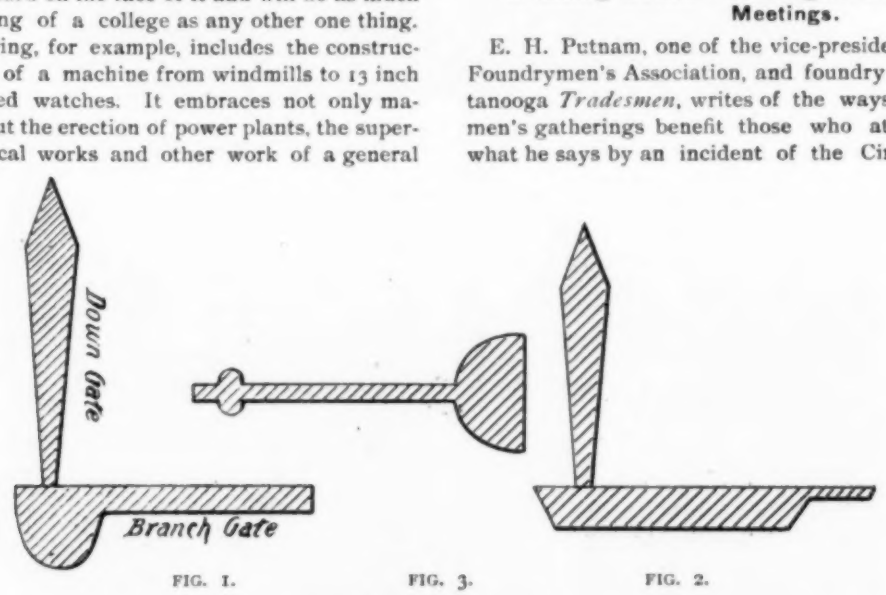


FIG. 1. FIG. 3. FIG. 2.

TWO METHODS OF GATING.

The work of an association of this character cannot be stated with any approach to exactitude. It is probably not too much to say, however, that the good accomplished by this society in the two years of its existence goes far beyond what anybody expected of it. The free interchange of thought and of experience at these meetings is helpful to every participant. The personal contact and oral converse is immeasurably better than the reading of cold print in the periodical trade journals. If a fellow has been writing something that is not "the whole truth" you find it out in conversation. If we have been advocating something, omitting certain features that don't suit our argument, we give ourselves away at the convention.

For instance, we read of some writer in the trade journal who is melting 12 of iron to 1 of coke, and then another, and another, till by and by we imagine that everybody but ourselves is doing the great act. But when we get to the convention, we learn that the majority are doing just as we are—using enough coke to insure good hot iron, thankful if it does not take more than one of coke to eight of iron. Again, there are many points of valuable information picked up in conversation, least expected, but none the less helpful. Apropos, the writer took to the convention with him a "set-gate," devised in such manner as to prevent slag or dirt from entering the mold with the iron. While exhibiting it to some friends, and discussing its effectiveness, a foundry superintendent from New England remarked: "We use set gates that have a downward projection just under the pouring gate, so that the iron, as it is poured into the mold, falls into a pool of

molten iron instead of striking upon the sand. The longitudinal section illustrated in Fig. 1 presents the idea. I should regard this as being an excellent device, especially where the sand used is at all inclined to 'cut.'"

Illustrations Nos. 2 and 3 show the set gate that I was exhibiting, No. 2 being a longitudinal section: No. 3 the plan. As is well known among molders, a narrow, deep gate will skin well. It will be seen that I get the benefit of this even in gating thin castings, simply by broadening and thinning the gate at the end next the pattern.

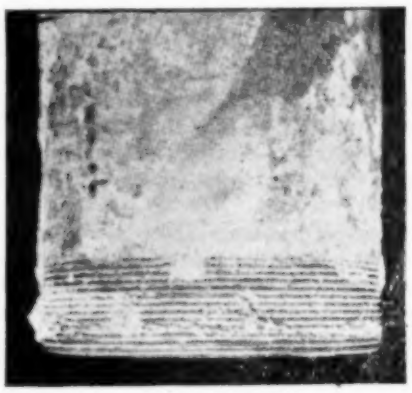
These are simply intimations of things learned at the convention. In fact, we get at these meetings more than can be told in many columns of print. And the effect of this education upon the trade generally is like that of all beneficent things, viz.: it benefits all, though the expense is borne by the few. The papers read were of great value, and the discussions thereon were instructive in a high degree.

The advancement in social economy incident to these meetings is immense. Suspicion, jealousy and estrangement are inimical to the highest welfare of industrial affairs; and these vanish under the magic touch of free and intimate association as developed in the American Foundrymen's Association. We are rapidly learning that the individual's self-interest is not best subserved by that which harms even his competitor; that demand for the products of labor and capital is not a foreign and fixed quantity to be scrambled for, as plunder, but that he who demands, supplies, and vice versa, and that these are properly limited only by human capacity to produce.

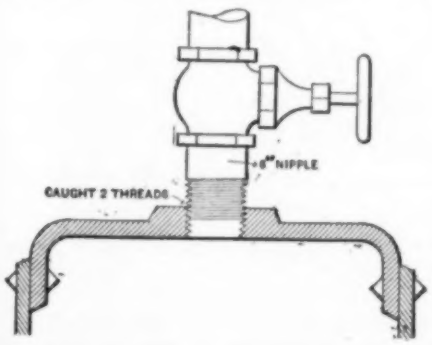
The association is making good progress in working out to final settlement many problems that have long vexed the foundry world. The relations between employer and employee, and the apprenticeship questions are prominent among these, and there is good reason to believe that both of these at least will finally be settled to the best interests of all parties.

A Dangerous Steam Connection.

In its last issue, *Power* gives a half-tone illustrating with what carelessness the work of piping about a steam plant is sometimes done. We reproduce the cut, which shows a 6-inch



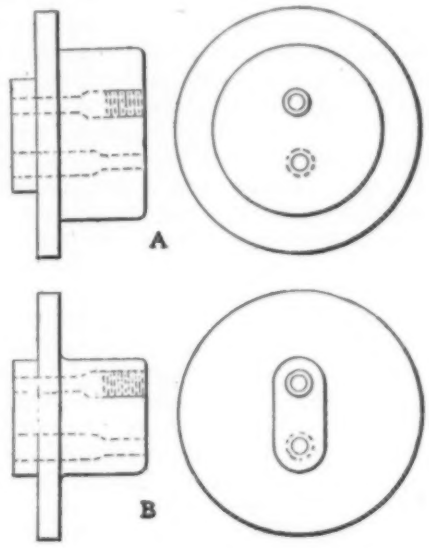
nipple between the dome of a horizontal tubular boiler and the stop valve. The nipple had only two threads caught in the dome, as shown in the outline sketch, the boiler carried 80 pounds pressure. The nipple was covered with asbestos



wick so that the threads did not show above the dome. The sample showed that the end threads only had caught, the others being rusty and clogged with wicking.

Making Air-Tight Castings.

Writing in the *American Machinist*, Edmund Stevenson, of Stamford, Conn., answers a question concerning metal that will stand high pressure. He says that "the shape of the casting has much to do with it. Make the casting of bronze and as thin as possible, to stand the breaking strain, and core



MAKING AIR TIGHT CASTINGS—A WRONG WAY AND A RIGHT WAY.

large, allowing as little as possible for finish. In pieces made as in sketch *A* the air came through the metal in a fine shower, while when made as in *B*, with the valve parts cored and with a small amount of finish, they were satisfactory."

Blast Furnace Gas for Motive Power.

The following translation is given by the *Railroad Gazette* of a few paragraphs (from the *Genie Civil*, of May 21), from a paper by A. Pourcel, on the "Utilization of Blast Furnace Gas for Motive Power:"

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On Saturday, July 9, the bridge over the Monongahela, to connect the Pittsburg, Bessemer & Lake Erie with the Union Line of the Carnegie Steel Co., was opened for traffic. The Pittsburg Bessemer & Lake Erie, instead of the Pennsylvania, will now handle the ore consigned to the Duquesne plant of the steel company.

MACHINE SHOP AND FOUNDRY.

Technical Graduates in the Shop.

The question of the efficiency, or inefficiency, of our technical schools is an ever fruitful one for discussion, and there are as many opinions regarding it as there are people to express them. Its latest phase has taken the form of answers to the question, "Why are our fresh graduates of engineering schools such incapable draftsmen?" which have appeared in at least two technical journals. Similar questions might be asked and often are asked regarding other lines of work. Managers wonder why these young men are so incapable in the shop, office, or engine room, and it seems to be the impression that, after four years' training, they ought to be able to turn their hands to anything in an efficient manner; if they cannot, then schools and school systems are blamed, and numberless suggestions are made for their improvement.

These views on the part of managers' are quite likely to spring from claims made by young graduates, and even by their instructors as well. It is too often claimed that a technical course equips a man in a thorough manner for practical work, making him capable of earning a good-sized salary in any department of his profession.

Such a claim is absurd on the face of it and will do as much to injure the standing of a college as any other one thing. Mechanical engineering, for example, includes the construction of every kind of a machine from windmills to 13 inch guns and full-jeweled watches. It embraces not only machine construction, but the erection of power plants, the superintendence of chemical works and other work of a general character; and in these different branches it includes all sorts of positions from president down to the man who chases castings. It is plainly evident, therefore, that it would be only by rare good luck that a student should secure a position for which he was fully equipped. What a college can do and does is to ground its men in general principles so that in after years they will be able to work understandingly and advance rapidly—though beginning, it may be, at the bottom like every one else. It does not make "efficient draftsmen," machinists, inspectors, designers, superintendents or efficient anything else, except efficient students, ready to learn practical lessons and to profit by them so well that they will soon become efficient in whatever position they may occupy. A college course is for general training, simply.

Take the subject of drawing. This is one of a large number of general subjects that enters more or less into all branches of mechanical engineering and therefore is one of the subjects that should be included in the general training. In one course of instruction that we have examined the total time devoted to drawing is equivalent to about three months of work at eight hours a day. This time, however, includes all the recitations and lectures, as well as the time spent in the drawing room. It also includes all the instruction in a theoretical course in descriptive geometry and in the course in machine design, by far the larger part of which would be other than drawing board work. It is safe to say that the whole time spent in actual drawing would not exceed two months of similar work in the drawing room.

It is probable that two months' time is all that it is thought best to devote to drawing. Only a small part of the graduates are to become draftsmen and the time must be given to other subjects. Two months' practice, however, will not make a good draftsman out of an untrained hand. He may either make neat drawings, or may draw rapidly, but he will not be able to do both at once, as he must do if he is to be an efficient workman. Moreover, how can a draftsman be called efficient before he has mastered the details of his line of work? One student might begin by detailing car trucks, another steam engines and another machine tools. They all have had the same course of study, general in its nature, and they all must secure their own special knowledge by practical experience.

We believe the colleges are doing good work and that their graduates are making a satisfactory showing. They are, in the main, securing good positions, and the records show that the average student steadily rises from the time of graduation. If, instead of being asked why students are inefficient when fresh from school, we were asked the more pertinent question, Why are they so efficient after they have had a few years' experience, we should say: Because they have been well grounded in general principles at school and because, at graduation, they have become efficient students, ready to profit by lessons that can be learned only in practical life.—[Machinery.

A Gating Device—Gleanings from Foundrymen's Meetings.

E. H. Putnam, one of the vice-presidents of the American Foundrymen's Association, and foundry editor of the Chattanooga *Tradesmen*, writes of the ways in which foundrymen's gatherings benefit those who attend, and illustrates what he says by an incident of the Cincinnati convention. We reproduce his observations from the last issue of the *Tradesmen*:

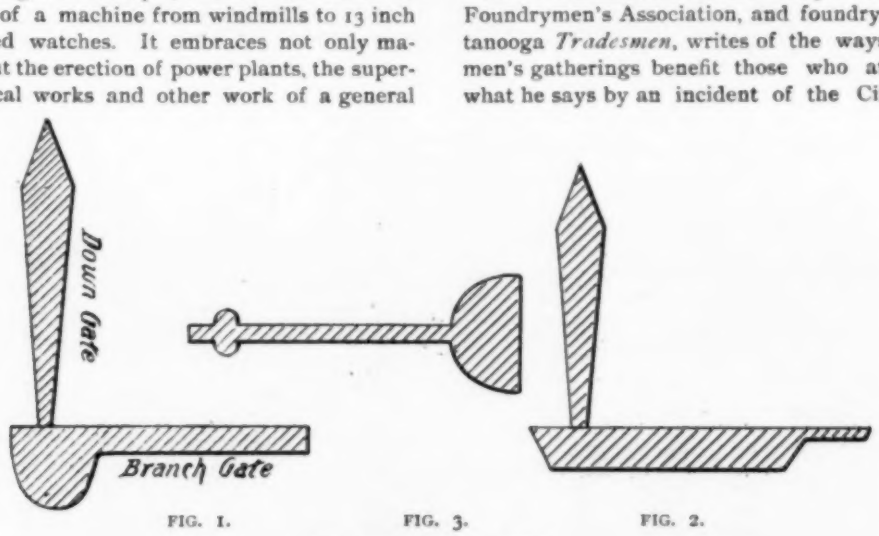


FIG. 1. FIG. 3. FIG. 2.

TWO METHODS OF GATING.

The work of an association of this character cannot be stated with any approach to exactitude. It is probably not too much to say, however, that the good accomplished by this society in the two years of its existence goes far beyond what anybody expected of it. The free interchange of thought and of experience at these meetings is helpful to every participant. The personal contact and oral converse is immeasurably better than the reading of cold print in the periodical trade journals. If a fellow has been writing something that is not "the whole truth" you find it out in conversation. If we have been advocating something, omitting certain features that don't suit our argument, we give ourselves away at the convention.

For instance, we read of some writer in the trade journal who is melting 12 of iron to 1 of coke, and then another, and another, till by and by we imagine that everybody but ourselves is doing the great act. But when we get to the convention, we learn that the majority are doing just as we are—using enough coke to insure good hot iron, thankful if it does not take more than one of coke to eight of iron. Again, there are many points of valuable information picked up in conversation, least expected, but none the less helpful. Apropos, the writer took to the convention with him a "set-gate," devised in such manner as to prevent slag or dirt from entering the mold with the iron. While exhibiting it to some friends, and discussing its effectiveness, a foundry superintendent from New England remarked: "We use set gates that have a downward projection just under the pouring gate, so that the iron, as it is poured into the mold, falls into a pool of

molten iron instead of striking upon the sand. The longitudinal section illustrated in Fig. 1 presents the idea. I should regard this as being an excellent device, especially where the sand used is at all inclined to 'cut.'"

Illustrations Nos. 2 and 3 show the set gate that I was exhibiting, No. 2 being a longitudinal section: No. 3 the plan. As is well known among molders, a narrow, deep gate will skin well. It will be seen that I get the benefit of this even in gating thin castings, simply by broadening and thinning the gate at the end next the pattern.

These are simply intimations of things learned at the convention. In fact, we get at these meetings more than can be told in many columns of print. And the effect of this education upon the trade generally is like that of all beneficent things, viz.: it benefits all, though the expense is borne by the few. The papers read were of great value, and the discussions thereon were instructive in a high degree.

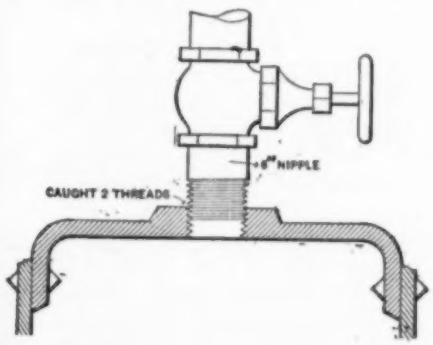
The advancement in social economy incident to these meetings is immense. Suspicion, jealousy and estrangement are inimical to the highest welfare of industrial affairs; and these vanish under the magic touch of free and intimate association as developed in the American Foundrymen's Association. We are rapidly learning that the individual's self-interest is not best subserved by that which harms even his competitor; that demand for the products of labor and capital is not a foreign and fixed quantity to be scrambled for, as plunder, but that he who demands, supplies, and vice versa, and that these are properly limited only by human capacity to produce.

The association is making good progress in working out to final settlement many problems that have long vexed the foundry world. The relations between employer and employee, and the apprenticeship questions are prominent among these, and there is good reason to believe that both of these at least will finally be settled to the best interests of all parties.

A Dangerous Steam Connection.

In its last issue, *Power* gives a half-tone illustrating with what carelessness the work of piping about a steam plant is sometimes done. We reproduce the cut, which shows a 6-inch

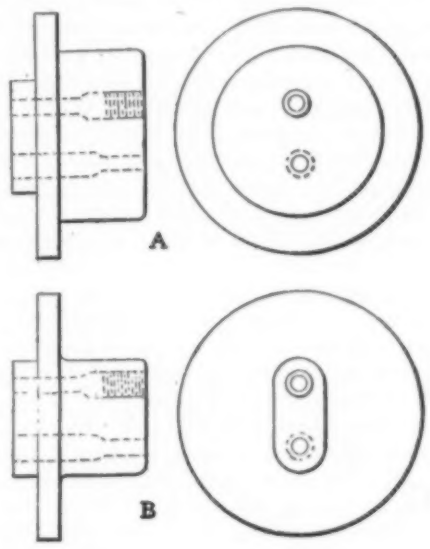
nipple between the dome of a horizontal tubular boiler and the stop valve. The nipple had only two threads caught in the dome, as shown in the outline sketch, the boiler carried 80 pounds pressure. The nipple was covered with asbestos



wick so that the threads did not show above the dome. The sample showed that the end threads only had caught, the others being rusty and clogged with wicking.

Making Air-Tight Castings.

Writing in the *American Machinist*, Edmund Stevenson, of Stamford, Conn., answers a question concerning metal that will stand high pressure. He says that "the shape of the casting has much to do with it. Make the casting of bronze and as thin as possible, to stand the breaking strain, and core



MAKING AIR TIGHT CASTINGS—A WRONG WAY AND A RIGHT WAY.

large, allowing as little as possible for finish. In pieces made as in sketch *A* the air came through the metal in a fine shower, while when made as in *B*, with the valve parts cored and with a small amount of finish, they were satisfactory."

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THE TROPENAS STEEL PROCESS.*

BY ALEXANDER TROPENAS.

Several processes for the manufacture of steel, by means of small converters, have been brought forward in recent years; every one of which, according to their inventors, possessed extraordinary advantages. These processes have been tried industrially and have been abandoned because the advantages claimed for them were not always justified, or had been exaggerated, and experience has demonstrated that they could not satisfy the practical requirements of the metallurgical industry. These failures have brought discredit upon all steel proceses based upon the use of small converters, and have caused many manufacturers to conclude that it is impossible to make good products with such small vessels. To what causes can the failure of small converters, so far, be attributed? Evidently because these processes did not realize the practical conditions absolutely indispensable to all steel manufacturing processes, viz: 1st. Regularity of working. 2nd. Regularity and absolute control of the quality of steel.

The process we are now introducing and which is the object of this paper, possesses the above mentioned features in the highest degree and these results are not based upon mere experiments, but upon a practical working of over six years. Our first converter, of a capacity of about 800 pounds, was erected in 1891-1892, in the works of Messrs. Edgar Allen & Co., Sheffield, Eng. The trials made with this experimenting vessel were so satisfactory, that after a few weeks the above named firm decided to build a 2-ton converter. The results obtained were exactly those we expected, and since then two other 2-ton converters have been erected. This firm has now three 2-ton converters, with which all its castings are exclusively made. The other plants were then erected in the following successive order:

2. Mr. E. Plichon, Paris, France, one 2-ton converter. The same success was obtained as in England. If it were not for the excessive cost of the land, next to this foundry, the plant would be doubled. 3. Messrs. Hachette & Driant, St. Dizier, France, one 2-ton converter. This plant has been recently doubled. 4. Mr. E. Breton, Maromme-les-Rouen, France, one 2-ton converter. 5. Messrs. Leonard-Giot, Marchiennes-le-Pont, Belgium, two 2-ton converters; quite recently, two other 2-ton converters have been erected and the foundry has been increased four times its original size. 6. Forges & Acieries, Odessa, South Russia, one 2-ton converter was erected at first; two others of same capacity have been added. 7. Usines Nevsky, St. Petersburg, Russia, two 2-ton converters. 8. Messrs. Elbertzhagen & Glassner, Mahr-Ostrau, Austria, one 2-ton converter; another of same capacity is now being built. 9. Messrs. Rudski & Co., Warsaw (Poland), Russia, two 1-ton converters; intend to build two others of 2-ton capacity each. 10. Usine Krauthein, Chemnitz (Altendorf), Germany, two 2-ton converters. 11. Mr. G. Fischer, Schaffausen, Switzerland, one 1-ton and one 2-ton converters. 12. Usine de Constructions Mecaniques, Kiew, South Russia, two 1-ton converters. 13. The Royal Woolwich Arsenal, Woolwich, England. This plant was started with two 2-ton converters, and six months later another one was erected. These three 2-ton converters have replaced three Siemens-Martin furnaces which have been torn down. 14. Driggs-Seabury Gun & Ammunition Co., Derby, Conn. (U. S. A.), now ready to start, one 2-ton converter. 15. The Yorkshire & Lincolnshire R. R., Eng., two 2-ton converters, in course of erection.

The above list of installations shows that our process has been applied in different countries, where the raw materials and the working conditions are quite different. In all of these works the plants have been used for manufacturing steel castings and some ingots also have been made. Every plant has been a success financially and technically. All the above firms produce castings for their respective governments and for prominent railways. They find no difficulty in fulfilling the requirements called for in the specifications.

The foregoing enables us to assert, without the slightest apprehension, that our process has proved itself to be practical.

*Read at the Cincinnati meeting of the American Foundrymen's Association, June, 1898.

The Plant.

The Tropenas process consists in the use of a special converter, in which the pig iron, melted beforehand, is treated and converted into steel. This vessel, like all other converters, is a sheet steel shell, lined inside with refractory bricks or ganister. The shell is fitted with two hollow trunnions carried on two pedestals, so that the apparatus may be tilted according to the requirements of the operation, i. e., charging the melted pig iron, pouring the steel, etc. The inside of the converter is so arranged that the metallic bath has a much greater depth or thickness than in all the other pneumatic processes. It is conical for small charges and cylindrical for large ones.

Upon one of the faces of the converter, and in a plane parallel to the axis of the trunnions, are fixed two wind boxes, connected by a conduit to the hollow trunnion communicating with the blowing apparatus. These two wind boxes are entirely independent of each other. Inside of the lower wind box a row of horizontal tuyeres terminate; these tuyeres are large in diameter, varying from 1¼ inch to 2 inches, according to the size of the converter; they open into the converter high enough to be always above the surface of the metallic bath.

In the upper wind box a second row of tuyeres is placed; they are flattened and their free section is equal to about three-fourths of that of the lower tuyeres. This row of tuyeres is placed above the lower row, the distance varying from 4 inches to 7 inches, according to the capacity of the converter. The upper wind box is connected to the air main by an independent pipe, fitted with a valve, allowing to regulate, at will, the flow of air discharged by the top tuyeres or to suppress it entirely. Lastly, in the horizontal plane, all the tuyeres are so placed that they cannot communicate any gyratory motion to the metallic bath.

When the melted pig iron has been run into the converter, the latter is turned up in such a manner as to bring the lower tuyeres near the metallic bath, but always above it. The top tuyeres air valve is now closed. Then blowing is commenced in this position until the carbon flame appears. When the operation is well under way, the top tuyeres valve is opened so as to admit through these tuyeres a supplementary quantity of air, which penetrates into the converter at a certain height above the metallic bath. This air meets the gases escaping from the metallic bath, and burns them, thus producing a zone of high temperature, which, by radiation, considerably increases the heat of the charge.

The operation is stopped when the flame disappears—this corresponds to extra soft steel. Recarbonizatoin is then made in the converter by means of a final addition, accurately weighed, thus allowing to produce exactly the hardness and quality of steel required.

The blast pressure required for good working varies between three and four pounds per square inch, according to the kind of pig iron treated. The blast can be produced by means of a blowing engine or by a rotary positive pressure blower, such as Root's for instance.

Characteristics of the Process.

By what we have said above, it is apparent that the characterstic features of the Tropenas process are the following:

1. Low pressure blast, always above the surface of the metal and through the lower or "fining tuyeres."

2. Disposition of the tuyeres in the horizontal plane so that the jets of air, arriving above the bath, cannot impart to the latter any gyratory motion whatever.

3. Great depth of the metallic bath so as to avoid churning and stirring of the latter during the operation.

4. Arrangement above the "fining tuyeres," and independent of the latter, of a supplementary row of "combustion tuyeres," so as to burn the combustible gases escaping from the metallic bath and thus increasing the final heat of the steel.

Objection has been made to surface blowing on the ground that a greater quantity of iron is burnt than with bottom blowing as in the Bessemer vessel. This is true in a degree. During a certain period of the operation, we have a little more red-brown smoke than in the Bessemer operation, but the loss of iron resulting does not exceed from one to one and a half per cent. These data are the result of several years' practice and of a very great number of operations. The low

pressure of the blast greatly attenuates this loss, which, evidently, would be much greater if we made use of the high pressure necessary with the Bessemer process. However, acknowledging this loss, it is easy to account for it when making out the cost price.

On the other hand, blowing above the surface gives a much better quality of steel than the other pneumatic processes, which blow from the bottom ormore or less below the surface of the metallic bath. During the whole time of the Tropenas operations the bath remains perfectly quiet, and this is entirely different from all the other processes in which a continuous mixture of metal scoria and air takes place. The steel produced by our process is purer and contains hardly any gas in dissolution. The operation being particularly quiet, there is no projection of steel, or very little, through the neck of the converter, contrarily to what occurs in the Bessemer, hence the saving of metal on this score compensates for the loss of from one to one and a half per cent due to the greater oxidation of iron resulting from blowing upon the surface.

By the use of the top tuyeres, the carbonic oxide gas (C. O.) arising from the metallic bath is transformed into carbonic acid gas (C. O^2.), thus greatly increasing the temperature of the final steel without increasing the cost price. This is accomplished by merely burning, in a practical manner, the gases, which all the other processes discharge, without utilizing, into the atmosphere.

The steel obtained being hotter and consequently more fluid allows the gases to escape more easily and when the metal is poured into the molds it is perfectly quiet. Owing to its high temperature, and consequent great fluidity, the pouring is much easier and the steel produced is better utilized, as no skull remains at the bottom of the ladles.

Quality of Metal Produced.

At the end of the Tropenas operation, before any final addition is made, the product obtained is practically pure iron. This enables us to produce currently, a very large number of steel castings for dynamos and other similar uses, possessing a very great magnetic permeability, and which, when analyzed, show from 99.75 to 99.80 per cent of pure iron. These pieces are particularly sound and when machined show no blowholes or similar defects. This is most assuredly an indication of the great purity of the Tropenas metal. It is easy to understand that the Tropenas metal, produced in such a state of great purity and at such a high temperature, enables us to make the most varied final additions with the view of producing different qualities of steel, from the softest to the hardest and all the intermediate grades; this being obtained by merely modifying the final addition according to the product required.

It is necessary to observe that, though the metallic bath is practically quiet during the operation, the reactions caused by the "fining" blast, are quite sufficient to secure a perfect homogeneity of the charge. This is clearly demonstrated when we pour a 2-ton heat into hand ladles for manufacturing small pieces. The steel from the first to the last ladle is absolutely the same.

The working of the Tropenas converter is not difficult. It requires, of course, some knowledge, but any intelligent foreman can be taught in a few weeks how to work the apparatus. Practice has shown that the products obtained are very regular and the signs of the operation are so clear that is is very easy to stop it at the proper time without the use of the spectroscope, when the metal is then completely decarbonized and contains but very small quantities of the elements originally held in the pig iron. The bath, at the end of the operation, being merely liquid iron, practically pure, it is a very easy matter to add a known quantity of final addition to obtain exactly the hardness and quality wanted.

Waste of Metal.

The waste of metal during the operation has been the object of special researches. The average, taken from a great number of operations, shows that the loss at the cupola varies between 5 and 6½ per cent. The waste at the converter, during the blow, varies between 10 and 12½ per cent. The average total loss in the cupola and converter is therefore about 17 per cent. This loss is in no way excessive, when it is considered that it applies to small converters and that the pig iron generally used for manufacturing steel castings contains from two and one-half to three and one-half per cent of silicon.

The pig iron, usually employed by us for manufacturing steel castings, has the following analysis:

Silicon,	from 2.50 to 3.50 per cent.
Manganese,	from 0.50 to 1.25 per cent.
Carbon,	from 3.00 to 4.50 per cent.
Sulphur,	from 0.03 to 0.06 per cent.
Phosphorus,	from 0.04 to 0.07 per cent.

It is necessary to mention that the more the pig iron is free from sulphur and phosphorus the better the results. However, when the results required are merely those needed for the navies and railroads, ordinary Bessemer pig iron, containing not over sulphur 0.06 and phosphorus 0.07 can be used. When the steel produced is to be submitted to particularly severe tests, it is better to use a pig iron as devoid as possible of sulphur and phosphorus.

The sands necessary for making molds are silicious sands containing a sufficient proportion of alumina to give the molds the required hardness. We do not give any analysis because we have generally found suitable natural sands in all the countries where we have erected our steel plants. Anyhow, it is possible to obtain what is required by a judicious mixture of the different kinds of sands available.

All machinery castings having to be machined upon several faces must be cast in dried molds, also large castings with great thicknesses. Less important castings for which slight defects such as pin holes, slight scales, etc., are not a sine qua non condition, are cast in green sand molds not dried. In the majority of foundries using our process, a great proportion of the castings are cast in green sand molds not dried or merely skin dried. The greater part of the small castings are cast in the same manner.

Reheating.

When the castings are taken out of the molds, it is not indispensable to reheat them. The steel as it comes from the converter is perfectly soft and malleable. The great majority of castings delivered to the trade are neither reheated nor annealed. When pieces, however, have great or uneven thicknesses, or when they are of a great bulk, it is preferable to reheat them for a few hours at a cherry red heat in an ordinary furnace, without the use of any iron ore or other recarbonizing elements. The object of such a reheating is simply to transform the crystalline structure of pieces having great thicknesses into a finer grain, or to relieve the molecular tensions due to the considerable shrinkage of steel when the castings have a great bulk. Reheating is also necessary when high mechanical results are to be obtained and principally when a great elongation is required.

The installation of the steel process proper requires first, one or several converters according to the quantity of steel to be produced. Each converter works in connection with a cupola, the latter is generally placed upon a metallic platform, high enough to allow the melted pig iron to run direct from the cupola into the converter. The cupola is operated in the usual manner by means of a fan or a positive pressure blower. The air blast for the converter can be produced by means of a rotary positive pressure blower, the air pressure being only from three to four pounds per square inch. The quantity of compressed air required is from 22 to 25 cubic meters per minute (776 to 883 cubic feet) per ton of pig iron to be treated.

Apparatus and Cost.

The expenditure necessary for a plant consisting of two 1-ton converters, two cupolas and their platforms, fans and rotary positive pressure blower, is about $6,500, erection included. The cost of two 2-ton converters, two cupolas, platforms, fans and blower is about $8,500, erection included.

To this must be added the cost of a crucible furnace for final additions, which we generally add in a melted state. The expenditure for such a furnace is a small one, and does not exceed from $150.00 to $200.00. Besides the steel producing plant proper the usual foundry apparatuses are necessary, such as flasks, ladles, tumblers, reheating furnace, ovens for drying cores, molds and hand ladles, sand crushers and mixer, forges for smithy, tools for cutting headers, cranes, etc.

Each operation in the converter lasts from 15 to 20 minutes; some time is required for pouring the steel into the molds

and for repairing the converter for another blow. We reckon when small pieces are manufactured and the whole charge has to be poured by means of hand ladles, that 40 minutes are necessary for a complete operation. When the pouring is made with large ladles it requires only 30 minutes. In the first case three operations can be made every two hours, and four operations in the second case. With such data it is easy to calculate what quantity of steel can be produced when working nine hours per day.

The converter lining lasts from 125 to 150 operations; the tuyeres from 30 to 40 operations, after which the latter must be replaced. While this is being done the necessary patching up of the lining is made according to requirements. If some holes have been formed, they can be plugged by means of a mixture of cement and brick. The linings are made with silica bricks, the cement being composed of quartz, sand and clay.

The cost of producing the steel varies from $5.00 to $6.00 per ton of 2,200 lbs. over and above the cost of pig iron, this includes all expenses incurred at the blowing apparatus, cupolas, labor, lining, tuyeres and all general expenses for the manufacture of the steel in the ladle, ready to pour. These prices are the result of the accounts of works in normal operation for several years and in which the yearly output is about 2,500 tons. With a greater production the cost is reduced.

Advantages of the Process.

The advantages our process offers, when compared to the Siemens-Martin process or open-hearth, are very important, when castings of all kinds, small, average and large, are to be manufactured in the same foundry. It is impossible to make small pieces with open-hearth steel, it is not hot enough, and a great quantity of the material is lost in the ladles by skull, etc. Our steel being very hot and very liquid, it is easy to cast all kinds of small pieces very thin and this is done without loss of metal. The open-hearth is not well adapted either for manufacturing average pieces for the same reasons as for making small castings.

Our process, on the contrary, is perfectly suited for all these requirements, because of the great advantage it offers of being able to take from the converter small quantities of steel, exactly what is required for filling mold, then to tap the vessel again for the quantity of steel necessary for another casting, and so on. We admit the superiority of the open-hearth over our process only when very large pieces are maunfactured continuously to the exclusion of average or small castings, but it cannot be denied that this is not usually the case with steel foundries. With our process we can, without any inconvenience whatever, cast very large pieces in a practical manner and still remain well adapted for producing average and small castings. We very often run in the same ladle 3, 4 and 5 successive melts and use the total metal to cast one piece, and this we do without any loss of material from ladle bottom skull, etc. Our steel is so hot and so fluid that it can be kept very long in a ladle without becoming pasty.

The open-hearth, to be worked economically, must be run continuously night and day, for if it is worked by day only, the heat must be kept up during the night and this is necessarily accompanied by a great expense in labor and gas. With our process, when the prouring is finished, everything is stopped and all expenses of labor and fuel are suppressed until the steel is again wanted. Our process also adapts itself better than the open-hearth to fluctuations in orders, it is, without possible discussion, much more elastic. According to requirements five or six operations, or even less, can be made in one day or 25 if necessary. The open-hearth, on the contrary, is not elastic at all, for it produces regularly the quantity of metal corresponding to its capacity, but the production can be neither increased nor decreaed to any great extent.

Each operation of the Siemens-Martin process being of the total capacity of the hearth, say from eight to ten tons, for instance, it becomes necessary to dispose of a large molding floor space, so as to distributo the quantity of molds corresponding to the weight of metal to be poured at one cast. With our process, on the contrary, we have a smaller charge to pour every 30 or 40 minutes, and, in such conditions, it is much easier to distribute the work without interfering with the foundry operation, which keeps going on as if pouring were not taking place.

Lastly, with our process we can re-use all our scraps, that is, runners, gate-ways, headers, etc., and this is done as easily as in the open-hearth, and, probably, more completely. So far as the quality of steel is concerned, our products are superior to those of the Siemens-Martin furnace. We have already replaced several open-hearth furnaces by our process, specially at the Royal Woolwich arsenal, and the manufacturers who have made such a change declare that they are entirely satisfied on all points of view. We can also, with our process, produce, outside of castings, several high grades of steel that the open-hearth cannot produce. So far as blow holes are concerned, we can say that our products are free from such defects, when the molds are well made and dried. A very great number of our castings are machined and are found absolutely sound.

We are now producing, in our works, about 30,000 tons of steel castings per annum, and the marked favor with which they have been adopted everywhere shows that they give satisfaction to all the industrial requirements. Our castings of ordinary soft quality weld as easily as iron, and they can be welded together or to iron exactly as the best soft steels produced so far by the basic processes.

We do not pretend to take completely the place of the present processes, but we sincerely believe that in foundries having open-hearth furnaces, our process would perhaps be a powerful adjunct, allowing to manufacture, in better conditions, of cast and quality, a great number of pieces for which the latter is not well adapted, such as small and average pieces, leaving exclusively the use of the hearth for heavy castings. In foundries having no Siemens-Martin furnace or for those to be erected, our process will enable founders to manufacture all kinds of castings, from the smallest to the heaviest without the necessity of erecting such furnaces. We believe that the use of our process, in this country, will also greatly increase the field for steel castings by making it possible to manufacture pieces which, so far, have not been made by the processes now in use.

Hydraulic Power on War Ships.

It has generally been allowed even by those who are most strongly in favor of its adoption that, owing to the conditions which govern the operation of most auxiliaries on board warships, economy must be sacrificed when a hydraulic system is adopted. Hydraulic motors for any of the varied purposes requiring power on warships must be designed large enough to meet the maximum requirements of the service, and if these motors are of the piston or plunger type, the regular form at present in use, the maximum amount of power will always be used, although the minimum work only is required.

If, instead of using a motor having cylinders with moving pistons or rams, utilizing the pressure to obtain power, and measuring out a given quantity of water for each movement, irrespective of the work to be done, the pressure water was applied to a properly designed wheel of the tangential type, an efficiency averaging about 70 per cent could be obtained with a great variation in the load, and thus one source of waste with this system would be avoided.

The direct ram would be still retained for certain purposes where precision of movement is of the first importance, such as in steering gears and gun-training movements.

The mania for direct-acting steam pumps to generate power for such an installation is the most fatal obstacle to be encountered in any effort to reach reasonable economy in a hydraulic system of power transmission on board our warships. In some of the battleships now building it is proposed to install, for the generation of hydraulic power, say, six duplex hydraulic pumps of 400 gallons capacity each per minute, at 600 pounds pressure per square inch. This requires 12 steam cylinders, 22 inches in diameter, and, say, 24 inches stroke, being with pump friction about 950 h. p. This will require with the type of pump proposed, not less than 95,000 pounds of steam per hour, and this certainly would give on the main engines 5,000 h. p. Half the total boiler power of the ship with forced draught would be absorbed by such a pump installation, if working at its full capacity. This is the main reason why hydraulic power is condemned. But there is no reason which we can discover why a hydraulic system of power distribution for all purposes requiring power should not be more economical than steam applied direct, provided ordinary steam pumps are avoided in the generating department, and something else than a water meter is used as a motor.—[George W. Dickie, in Cassier's Magazine.

COCHRANE SEPARATORS

"BLUE STEAM."

Ever notice the color, or apparent color effect, of a jet of steam issuing from a pet cock in a live steam main? Was it whitish? That was due to entrained moisture. The bluish color, or perfect transparency, is present only when the steam is dry.

Dry steam (it does not matter how wet it was originally) can always be had using a COCHRANE STEAM SEPARATOR. The mission of these appliances is to take water out of steam--to insure dry steam to engines, whether the steam comes ladened with a small quantity of moisture, or whether it is carrying a "flush" or a "slug" of water.

In our new Separator catalogue, which is fully illustrated, we detail something like 105 different sizes and constructions—building Separators to suit the conditions, being one of our hobbies. Postal requests for catalogues will not be noticed.

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(Columbia Station), PHILADELPHIA, PA.

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COCHRANE HEATERS.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

Articles of incorporation have been filed by the Standard Boiler Co., of Goshen, Ind. The capital stock is $50,000 and the directors are John N. Greeg, Samuel K. Greeg and Tessie B. Greeg.

The Hooker Steam Pump Co., of St. Louis, capital stock $5,000, has been incorporated by J. E. Gorman, W. D. Hooker, W. C. Farrar and Robert L. McLaren.

W. M. Earl, W. H. Wilson, E. L. Wilson, and E. T. Wilson, have incorporated the Earl & Wilson Co., for the manufacture and sale of the Earl & Wilson grate bars, and to conduct a general foundry and machine business at Gastonia, N. C.

The Meehan Boiler & Construction Co., Lowellville, O., is in the market for a large horizontal angle and beam bending machine—new or good second-hand.

The National Boiler Works Co., of Syracuse, N. Y., capital $40,000, has been incorporated. The directors are William H. Wood, of Medina, Pa.; H. N. Babcock, of Syracuse; H. T. Webb, of Skaneateles, and Robert Joy, of Oswego.

The Hooker Steam Pump Co., of St. Louis, has been incorporated for $30,000, by J. E. Gorman, W. D. Hooker, W. C. Farrar.

A movement is on foot in New Haven, Conn., to organize a company for the manufacture of motor vehicles in the factory of the New Haven Rattan Co., recently purchased by I. M. Dann, who expects to form a company with $300,000 capital stock and to employ 300 workmen.

More machinery is required for Mare Island. The bids will close July 26. The wants include: Motor-driven, single plate planing machine; belt-driven, single punching or shearing machine; two radial jib countersunk drilling machines; one emery wheel floor grinder, two wet grinding stones, 18-inch screw cutting engine lathe, 48-inch vertical boring and turning machine, one tool grinding machine and emery wheel, band saw for sawing metal, brass founder's spruce cutter, improved jointing and facing machine, standard chain-saw mortiser, double spindle upright molding machine.

New Construction:—

The People's Light & Power Co., of Jersey City, N. J., is erecting a new boiler house in connection with its electric plant. The building is 60 feet wide and about 90 feet long, contains ample space for the large upright boilers and has an arrangement for the storage of coal in the steel bunker, inside the building, so that the fuel can be easily taken into the boilers direct. The tracks are arranged so that railroad cars will run into the building and discharge the coal directly into the bunker. It is of fire proof construction throughout, with steel frame work, brick side walls, and iron roof covering, well lighted and ventilated. The steel work is being furnished and erected by the Berlin Iron Bridge Co., of East Berlin, Conn. Sanford & Stillman, of Jersey City, have the contract for the building.

The Reading (Pa.) Crane & Hoist Works have settled down in their new shops which they erected on a lot 220x250 feet, connected by a siding to the main line of the Philadelphia & Reading Railway. They are reported exceedingly busy on orders for hand power traveling cranes, overhead tracks and chain blocks. Formerly exclusively engaged in the manufacture of the economic safety hoists, they have recently added several other styles of chain blocks, the novel features of which are covered by late patents. The Reading Crane & Hoist Works are now prepared to meet any demands made on chain blocks, having them in four styles, from the geared differential to the multiple spur geared type. Particular attention is paid by the company to all features which tend to diminish loss by friction in such machines.

Work is in progress on the new foundry of the Northwestern Malleable Iron Works, South Side, Milwaukee. Three fur

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Cut Everything. - - - -

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No. 4. " 8 "
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SAN FRANCISCO, John Woodlock, 26 Beale St.

naces will be installed. The building is 520x70 feet, with three wings 37 feet long. The six furnaces the company is now operating give an output of 30 tons.

Negotiations have been entered into for the establishment of a blast furnace at Fort William, Ont. S. F. Eagle and John Crerar, of Chicago, recently laid proposals before the municipal authorities. The town has a standing offer of a bonus of $50,000 to any company who will establish and operate iron smelting works.

It is reported that the Slaymaker-Barry Co., has decided to rebuild at once the lock works at South Connellsville, Pa., at a cost of about $40,000.

The York (Pa.) Mfg. Co. will erect a two-story machine shop, according to reports Electrical equipment are required.

At Louisville, Ky., the iron foundry of Snead & Co., destroyed by fire on June 23, will be rebuilt at once. Estimated loss, $150,000; insurance, $136,800.

The Diamond Drill & Machine Co. has commenced the construction of a new building at the Birdsboro (Pa.) Works. This building will be 80x30 feet, in which new machinery will be installed.

The National Tin Plate Co., at Monessen, Pa., expects to put its present plant in operation about Aug. 1. The intention of the company is to put in more mills and make it one of the argest plants in the country. Bids for the equipment willl probably be wanted in the near future.

At Marseilles, Ill., the Marseilles Mfg. Co. has about completed arrangements for erecting a galvanizing plant and will galvanize its windmills instead of painting them.

The Ontario Malleable Iron Co., at Oshawa, Ont., has begun the construction of a building 150x200 feet, to be used as annealing and molding rooms.

Vice-president Bowron, of the Tennessee Coal, Iron & Railroad Co., makes the statement to a Birmingham paper that on June 30 signatures were obtained guaranteeing the subscription for $925,000 of bonds of the Alabama Steel & Shipbuilding Co., guaranteed by the Tennessee Coal, Iron & Railroad Co., thus insuring the construction of the $1,000,000 steel plant at Ensley City as soon as Birmingham capitalists subscribe so much of the remaining $175,000 of the bond issue as may be left after the stockholders of the Tennessee Co. have been offered the bonds. The local subscription is assured. Mr. Bowron adds: "It has been carefully estimated that for the purpose of constructing this plant and the homes for the operatives who will be employed there, and for supplying the necessary materials for its consumption from the various blast furnaces, ore mines, coke ovens, and collieries in the district, there will be sufficient additional workmen employed to make up together with their families on an ordinary basis of computation 25,000 additional population."

The Pittsburg Bridge Co. has been awarded the contract for furnishing the steel structural material for the additional power house of the Metropolitan Street Railway Co., Chicago. The new structure will require 600 tons of material.

The A. W. Stevens Co., of Marinette, Mich., has adopted the plans for its new plant, as made by Ferry & Clas, of Milwaukee. There will be 10 buildings, the main building two stories, with several wings. It will be 190x60 feet, with two wings, 240x60 and 160x60 feet.

Extensive improvements are to be made at Mary Furnace of the Ohio Iron & Steel Co., Lowellville, O., which will go out of blast about July 20. The stack will be made 80 feet high and its diameter increased. All the iron construction will be built anew—a new shell, new dust catcher, downcomer, bustle pipe, hearth jacket, bridge and platform. The iron construction will rest on 19-foot columns on new foundations. A new hoisting tower will be erected, 90 feet in height, equipped with Crane's new steel cages, 9x8 feet. The shell will be lined with Benezet brick to a diameter of 12 feet at the hearth and 18 feet bosh. There will be eight rows of copper plates of the Scott type, and all the equipment in the blast and reduction area will be of the most modern type. The steam plant will be increased by 500 h. p. water tube boilers. Two of the engines will be completely rebuilt, with new steam cylinders and other improvements. There is ample blowing power, a Wm. Tod & Co. engine, 84-inch tubs and 60-inch stroke, having been added some time ago The water supply will be ample, with the construction of a reservoir on the hill back of the furnace, with a capacity of 5,000,000 gallons. The casting house will be raised ten feet and the stock-house 11 feet. A complete alteration of tracks will be made, to secure the greatest economy in handling material. Three new trestles are to be built, 30 feet high and 600 feet long, the first 300 feet running over a system of ore, coke and limestone bins. It is calculated that with these radical changes the furnace will have a capacity of 350 tons a day. About 60 days will be required to complete the improvements, and in the fall a fourth Kennedy 20x90 stove will probably be added. The contract for the re-construction has been given to the Meehan Boiler & Construction Co., of Lowellville.

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Additions, Enlargements, Removals, Etc.:—

An addition 100x40 feet has been built to the machine shop of the Betts Machine Co., Wilmington, Del. Tools of modern design are being installed, some of the larger ones being of the company's own manufacture.

The Brown Mfg. Co., of Zanesville, O., will build an addition 176x50 feet and three stories. A new Corliss engine, 400x500 h. p., will also be added.

Plans are being prepared for an addition to the machine shop of Jones & Laughlins, Ltd., Pittsburg. Several frame dwellings will be torn down and the shop extended to Carson street. Other improvements are being made.

The Janney Mfg. Co., of Muncie, Ind., is making arrangements to establish its agricultural implement factory in Ottumwa, Ia.

The Q & C Co., of Chicago, is making an important increase in the size of its plant at Chicago Heights, Ill.

An addition is planned to the shops of the Marion (O.) Malleable Iron Co.

The Almy Water Tube Boiler Co., Providence, R. I., has erected a large addition to the shop, and the arrangement of the machinery is changed, a large open space being left in the center of the building for the erection of boilers.

Fires and Accidents:—

At the Illinois Steel Co.'s Bay View plant fire in the enameling department in which band iron is dipped, caused a loss of $2,500.

General Industrial Notes:—

The Sterling Emery Wheel Mfg. Co., Tiffin, O., has had a large business so far this season, and though recent improvements in their plant have nearly doubled their capacity, they have been obliged to run nights in order to keep up with the demand.

Wm. Swindell & Bros., engineers and contractors, Pittsburg, have received a contract from the Shenango Valley Steel Co., New Castle, Pa., for eight recuperative annealing furnaces with complete gas plant. They have also just completed five of these furnaces with gas plant for the United States Iron & Tin Plate Mfg. Co., Demmler, Pa. An additional contract from the Firth-Sterling Steel Co., Demmler, Pa., calls for 30-pot crucible steel melting furnaces and eight gas-fired projectile annealing furnaces. They are also building for the Carpenter Steel Co., of Reading, Pa., two 30-pot crucible melting furnaces and four regenerative heating furnaces.

C. F. Harlow & Co., 370 Atlantic ave., Boston, have just shipped to the Government 14 Greenerd arbor presses for the Watertown arsenal, and the Washington Navy Yard.

The Miami Cycle Co., Middletown, O., has a $50,000 Government contract to furnish shrapnel.

The Totten & Hogg Iron & Steel Foundry Co., Pittsburg, manufacturer of rolling mill engines, has just closed a contract with the Humbert Tin Plate Co., of Connellsville, Pa., to furnish two extra hot mills complete, two doubling shears and one squaring shear, three shears to be arranged with electric motors; also to take the present cold rolling mills and

INLAND IRON & FORGE CO.,

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Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.

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to furnish them with two extra cold rolling mills and gearing necessary to equip them with a tandem cold rolling mill complete. This company also has the contract with the La Belle Iron Works, of Wheeling, W. Va., to furnish an additional cold rolling mill complete.

The shut down of the American Tin Plate Co.'s plant, at Elwood, Ind., is for two weeks. Work is being pushed rapidly on the six-mill plant, to be removed from Montpelier.

At New York, the United States Foundry Co., manufacturer of sash weights and general castings, made an assignment.

One of the blast furnaces of the Illinois Steel Co., at Bay View, started up last week, men being imported to take the strikers' places. Laborers are paid $1.15; the strikers demanded $1.25 for common labor.

The Kahn Stove Works, at Hamilton, O., have a second contract from the Government for 500 camp stoves.

Wages at the steel works of the Colorado Fuel & Iron Co., Pueblo, Col., have been advanced 5 per cent.

A number of heaters and puddlers at the works of Jones & Laughlins, Ltd., have refused to sign the firms' 18 months' agreement and have been discharged.

The Shimer Fence Co., of Anderson, Ind., is reported to have been sold to the Oliver interest of Pittsburg, for $100,000, possession being given July 1.

Statements concerning the stock of the American Steel & Wire Co. are plentiful in the stock columns of the daily papers. The common sold up to 42¼ last week and the preferred at 92¼. The preferred stock is a cumulative 7 per cent security. This amount, the officers say, can be paid from the start. Dividends on the common stock will not be paid for a year.

The Weimer Machine Works Co., of Lebanon, Pa., has received an order from the Atlantic Iron & Steel Co., of New Castle, Pa., for two improved blowing cylinders, 72 inches diameter by 48 inch stroke. These cylinders will be placed on engines the company now has in use.

The board of directors of the Bethlehem Iron Co., Bethlehem, Pa., report net earnings for the year $1,083,000. Two dividends of $200,000 each have been paid and the balance, $683,000, was credited to profit and loss.

George C. Keene & Co., Cincinnati, are building a 25,000-pound corrugating machine, for making steel roofing, for the Cambridge (O.) rolling mills, and one of the same size for the American Steel Roofing Co., of Cincinnati. Heavy machinery will also be sent to Memphis, Tenn., for making steel stoves and ranges, and sheet metal working machinery to Norfolk and New York.

The Thompson Fish Plate Co., has taken charge of the plant of the Albany Iron Works, Albany, N. Y.

The Kepp Gear Wheel Co., of Allegheny, Pa., has made a voluntary assignment to Peter Yocum.

In the tin plate plant of the United States Iron & Tin Plate Mfg. Co., at Demmler, Pa., seven mills are running and four more are in course of erection. Six mills will have double stands of housings, so that they can be used for sheet iron or black plate.

At East St. Louis Ill., the plant of the Missouri Malleable Iron Works is undergoing improvements.

The A. Garrison Foundry Co., of Pittsburg, has purchased from the Pond Machine Tool Co., a 10 to 16 foot boring and turning mill and a 48-inch by 20-foot planer.

The Ontario Rolling Mill Co., Hamilton, Ont., will manufacture puddled iron and has contracted with the Hamilton Blast Furnace Co. for 5,000 tons of pig iron.

The Illinois Steel Co.'s receipts of iron ore in the month of June reached the total of 371,200 tons. This is considerably in excess of all previous records. The ore was brought by 125 boats.

The plant of the Keokuk (Ia.) Stove Co. has been sold to C. H. Castle, for $7,500.

There is no truth in the report in a Cleveland paper that the HP Nail Co. will withdraw from the American Steel & Wire Co., and resume operations as before. There is no HP Nail Co., all the concerns going into the American Steel & Wire Co. being bought out and merged in it.

The Rarig Engineering Co., of Columbus, O., has recently been awarded a contract by the Government for making a large number of gun carriages for 12-inch mortars. The company reports business to be very good, with excellent prospects ahead.

The new 16-inch continuous billet mill has been put in operation at the Duquesne Steel Works. The mill is composed of five sets of rolls, placed tandem. The machinery is all new and up-to-date.

The Frankstown Mills, at Pittsburg, owned by the Oil Well Supply Co., start up next week after an idleness of five years and will be running in all departments within three weeks, employing from 1,300 to 1,500 men. The mills have undergone extensive repairs in the last few weeks.

SUMMER IN COLORADO.

Special Tourist Tickets via Pennsylvania Lines.

Colorado is particularly inviting as a summer haven. The climate is remarkable for its invigorating effect, and the State is rich in grand scenery and points of interest where a vacation may be pleasantly spent. Special arrangements are being made for the entertainment of visitors who are this season expected to be attracted to the seclusion and quiet of the Rockies and the hills and canyons of that great wonderland.

Colorado to-day is nearer home than in former years. The fast schedules of the Pennsylvania Route and connecting lines bring the Centennial State within easy reach, and the cost of a trip thither is no longer a luxury. The special low rate Tourist Tickets over the Pennsylvania Lines places the cost for transportation within the limit of the usual allowance for vacation trips. For special information about rates, time of trains and other details please apply to nearest Pennsylvania Lines Ticket Agent, or address C. L. Kimball, A. G. P. Agent, Cleveland, O.